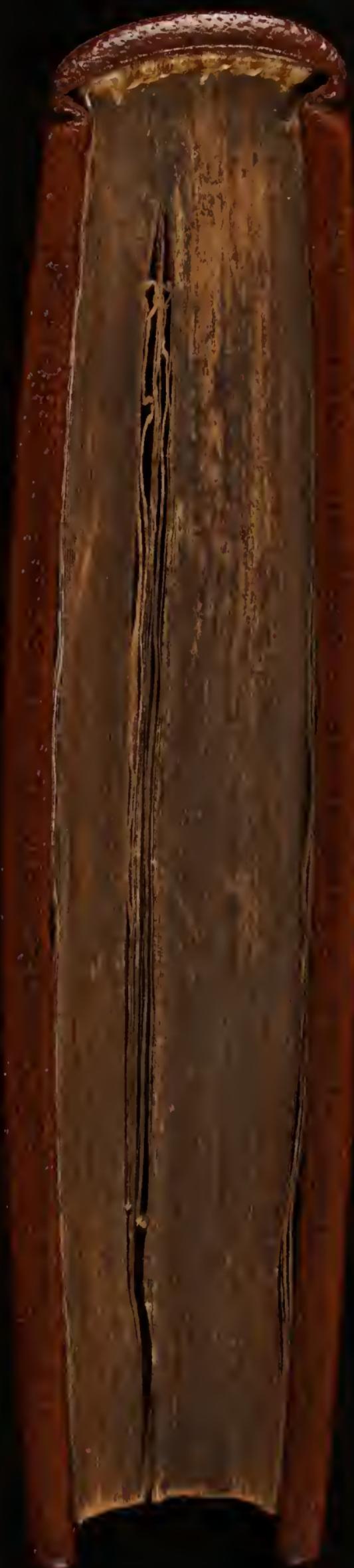


EXPERIMENTS
ON
VIPERS

CHARAS

1670





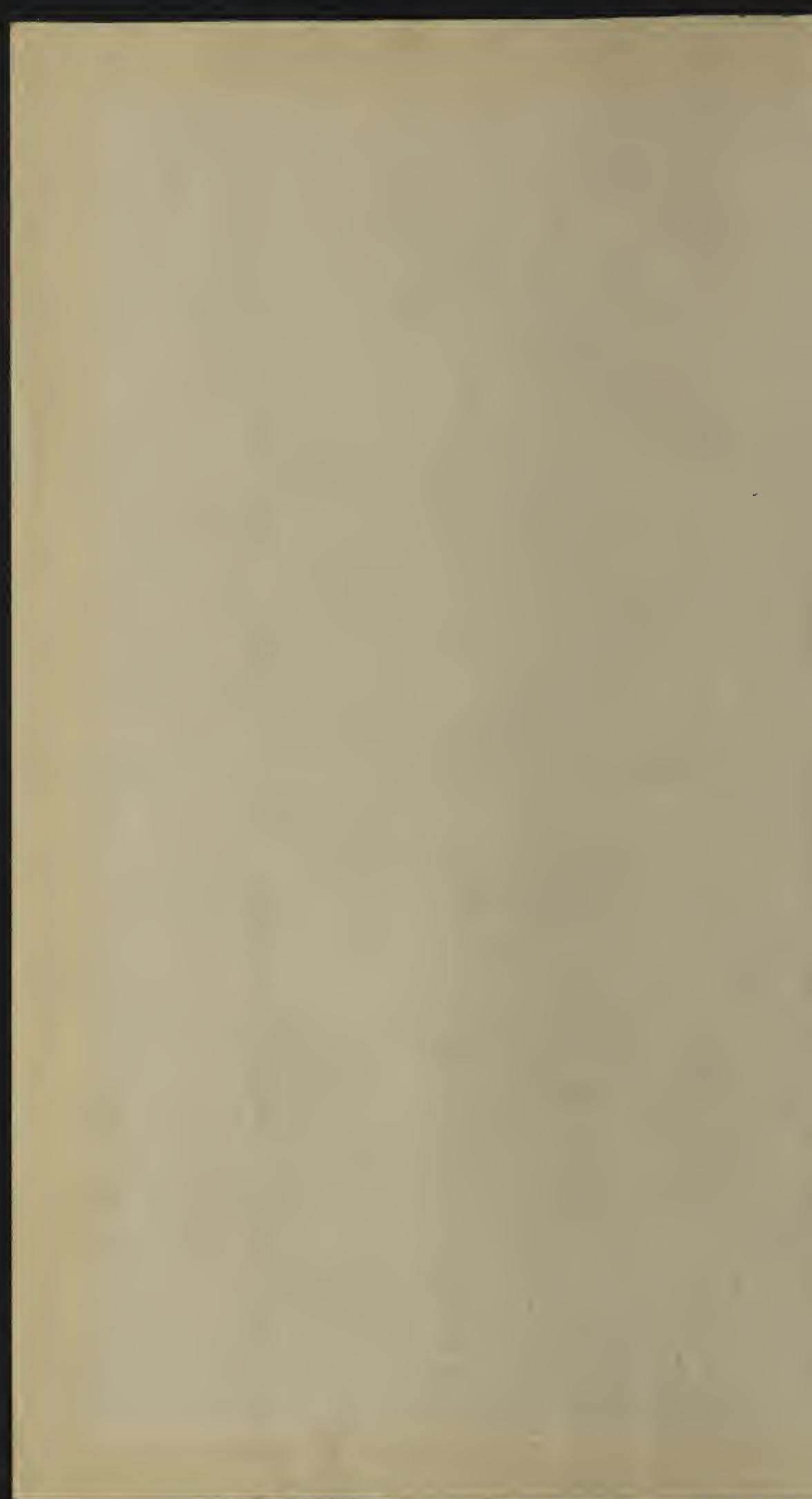


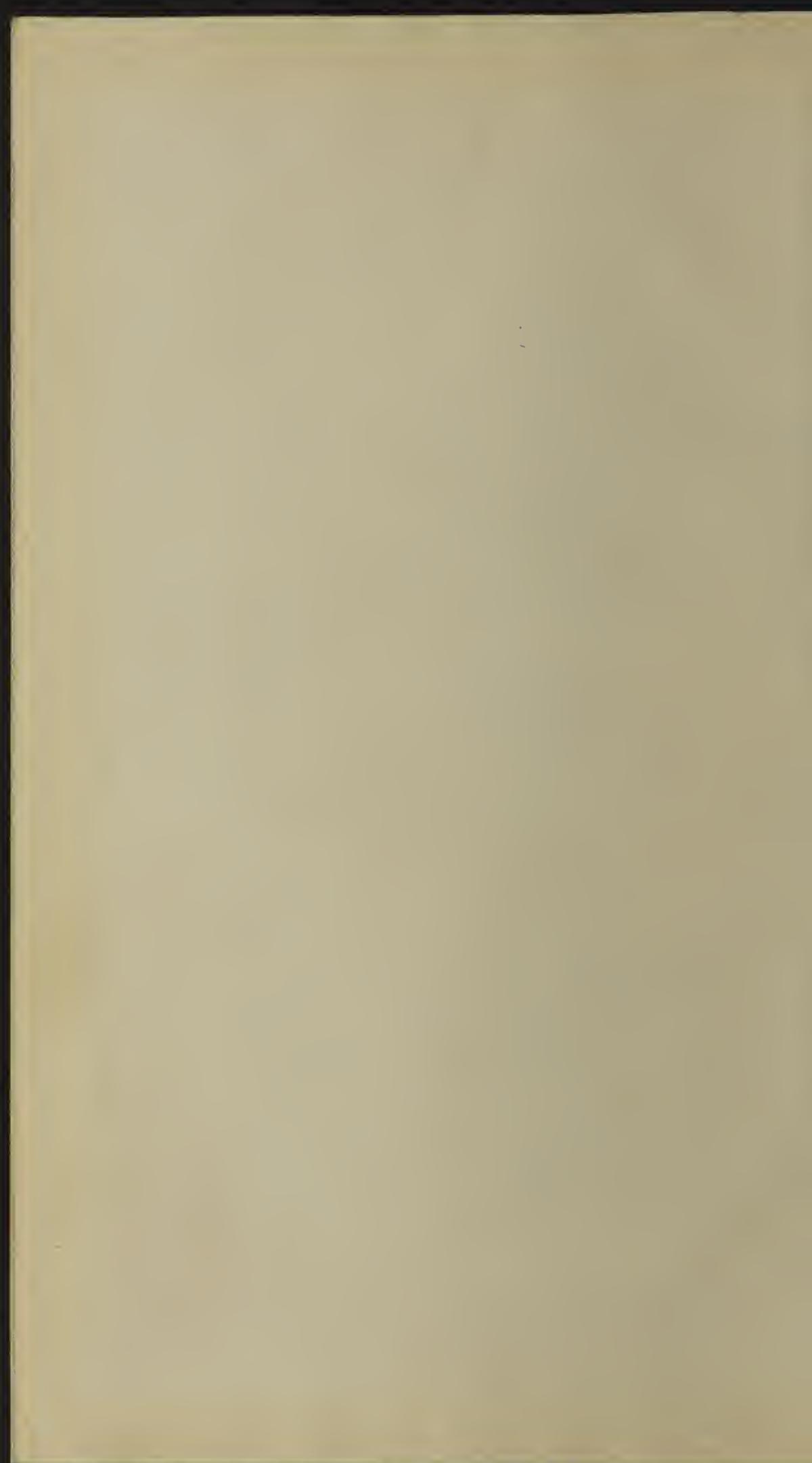
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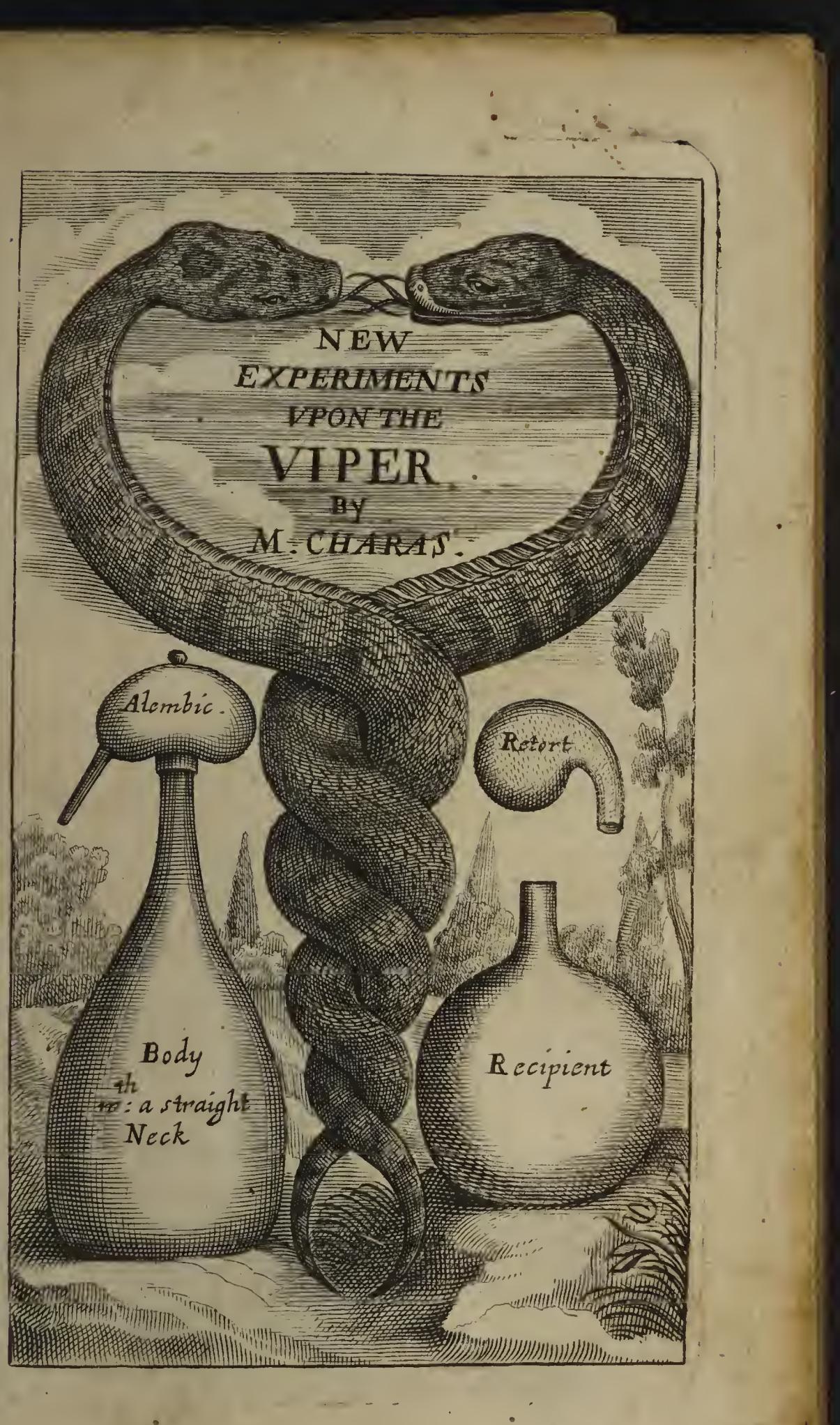
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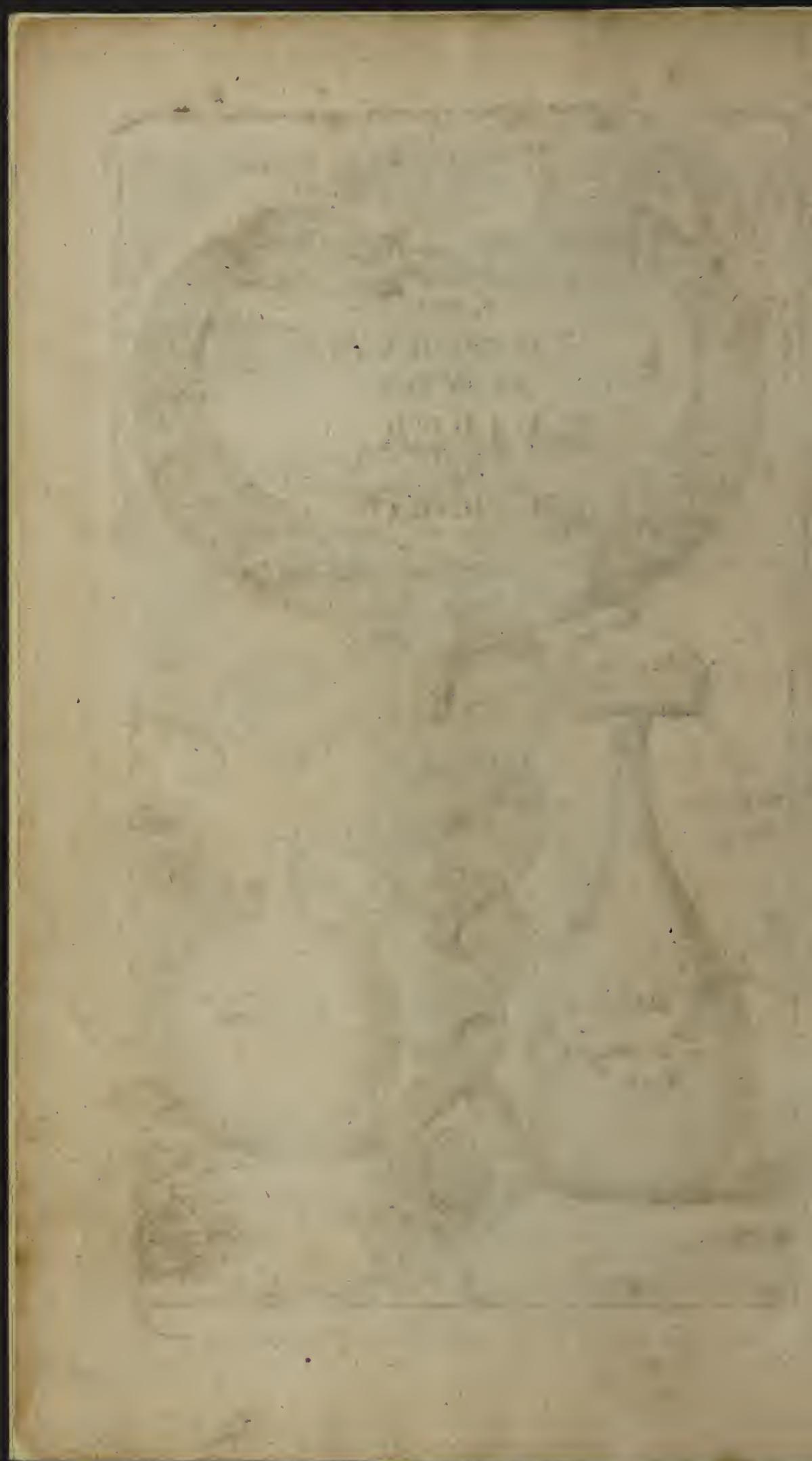
NEW
EXPERIMENTS
UPON THE
VIPER
BY
M. CHARAS.

Body
th
re: a straight
Neck

Alembic.

Retort

Recipient



NEW EXPERIMENTS
UPON
VIPERS.
Containing also an Exact
DESCRIPTION
Of all the
Parts of a VIPER,
The SEAT of its
POISON,
AND THE
Several EFFECTS thereof,
Together with the
EXQUISITE REMEDIES,
That by the Skilful may be drawn from Vipers,
as well for the Cure of their Bitings, as for
that of other Maladies.

Originally written in French
By M. CHARAS of Paris.

Now rendred English.

Multa Patres olim : Nos plurima, plura Futuri
Invenient; Cupidis nec porta negata Novorum.

LONDON, Printed by T.N. for J. Martyn, Printer
to the R. Society, at the Bell in S. Pauls Church-yard, and
a little without Temple-Bar. 1670.



THE
Preface.



Any will perhaps wonder, that after so many famous Anthours, Antient and Modern, who have written of VIPERS, I should yet undertake to labour in an Argument, which in all likelihood they should have exhausted. But if reflexion be made on the many wonders, that are found in the Body of this Animal, it will be easily granted, that it cannot be inquir'd into with too much exactness, and that it is not a work, that can be finish't at one or two sittings.

What Observations have been left us by knowing men, although they be not carried to their perfection, may be very useful to those, that are come after them, to make them discover what had escap'd their diligence. And without this aid, I should not have had the

The P R E F A C E.

confidence of undertaking this Work; in which I have propos'd to my self three main things, that may much contribute to the illustration of the History concerning Vipers. The first is, to examine sundry Observations of the Antients, which have hitherto pass'd for true, though most of them are not so. The second, to give an accompt of other Observations, which have been unknown to our Predecessors. The third, to find in the Viper, which causeth so many mischiefs, Specifick Remedies against its Biting, which had not been discover'd before, and may serve to overcome many troublsom Distempers, which the ordinary Remedies were not able to conquer.

The Enterprise, certainly, is bold; and, I confess, I should never have compass'd it, what hope soever I might have conceived of it, had I not been assisted by some knowing Physitians, whose light hath been very helpful to me.

Their Modesty permits not, I should here name them; it sufficeth the Publick to know, that a good part of the rare things in this Treatise is due to them. They had the kindness to meet often at my House for the space of three months, and there to see.

made

The PREFACE.

made exact Dissections of Vipers, which by my care were brought to me from all Parts of this Kingdom; and to see also Experiments tryed of their biting, upon divers Animals, and to examine their Bodies, immediately open'd after their death, to discover the true cause of it; and to prescribe Remedies, answerable to their Conjectures, and to take notice of the success of the same.

In dissecting all these Vipers, we were willing to see the parts, which Authors have taken notice of, and which have also been represented in the Books of some of them: And comparing them with the Natural ones, that were before our Eyes, we found great omissions of very considerable parts; an introduction of some imaginary ones, and representations and situations of several that were ill designed, and ill enough placed. It was thought fit, I should endeavour to perform something more accomplish't: And Monsieur Bosse, whose skill and dexterity in the Art of Designing and Graving is known and esteem'd of all the World, in things of a far sublimer nature than the Anatomy of Vipers, being happily present at one of our meetings, and taking great pleasure to oblige

The PREFACE.

his Friends, express'd from that very time, that he was very willing to second my intentions. And having received from me a sufficient number of Subjects, hath taken the pains to design them after the life, and thereupon to grave all the considerable parts of this Animal. In a word, I have omitted nothing of what might render my Design answerable to the wishes of all Learned and Curious men.

Now as those, who, speaking of a matter that hath been often handled by others, cannot but must often repeat again, what hath been already said of it; I thought, I was not to scruple to enlarge my self a little, that I might not give an imperfect Anatomy of the Viper, of which it was fit enough to describe as well the great number of the true parts, that have been known to our Ancestors, as the new ones, by me found after them.

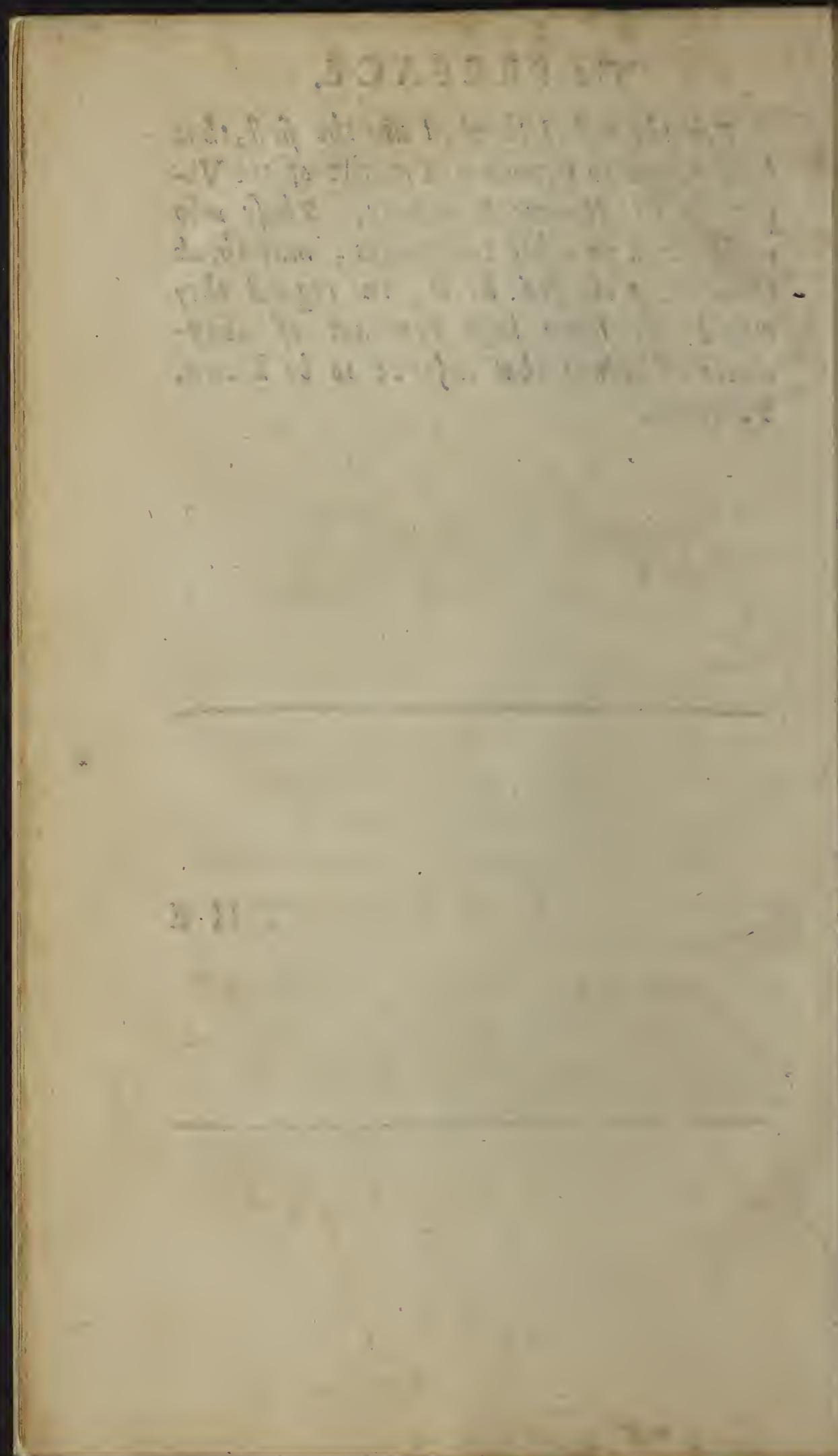
I say nothing of my way of Writing. From a person of my profession, you are not to expect the Elegancy and Purity of our Tongue. I thought it enough for me, to deliver my self clearly and intelligibly, which is, in my opinion, all that could be expected from me.

For

The PREFACE.

For the rest, I think, I am the first, that hath given to France a Treatise of the Viper in its Native Language. Those who understand no other Languages, may think themselves obliged, by it, in regard they would else have been ignorant of abundance of things, that deserve to be known. Farewell.

THE





THE TABLE Of the Titles of all the Con- tents in this Book.

Anatomy of the Viper.

Chap. I. **G**eneral Observations upon
the Viper.

Description of the Viper.

Ch. II. of the Parts which present them-
selves first of all. Of the exteriour shape
of the Viper. Sect. 1.

Of the skin of the Viper. Sec. 2.

Of the parts of a Vipers Head.

Ch. III. of the Vipers Nose. Sec. 1.
of

The CONTENTS.

of the Skull. Sect. 2.

of the Brain. Sec. 3.

of the Eyes and their principal Parts,
and of those that serve for Hearing.
Sect. 4.

of the Bones of the Head that are articulated to the Skull. Sec. 5.

of the Teeth. Sec. 6.

of the Nerves, Veins, Arteries, and
Muscles of the Head in general. Sec. 7.

of the Salival Glands of the Viper.
Sec. 8.

Ch. IV. of the other Bones of the Viper, and
of the principal parts that depend therefrom.

Ch. V. Of the other internal parts of the Viper.
Of the Tongue. Sec. 1.

of the Wind-pipe, and the Lungs.

Sec. 2.

of the Heart and Liver. Sec. 3.

of the Gall and Pancreas. Sec. 4.

of the Weasand and Stomach. Sec. 5.

of the Guts, kidneys, Fat, and a Coat
wrapping them up under-neath. Sec. 6.

Ch. VI. of the Organs of Generation in a Viper.
Sect. 3.

of the parts of a Male. Sec. 1.

of the parts of Generation in a Female.

Sec. 2.

of

The CONTENTS.

Of the Generation and Birth of Vipers. Sec. 3.

The Explication of what is represented in the first Cut.

The Explication of what is exhibited in the second Cut.

The Explication of what appears in the third Cut.

Experiments upon Vipers.

Ch. I. A Biting of a Viper happn'd to a Man.

Ch. II. Experiments of Vipers upon divers Animals. Experiments on Dogs.

The Biting of a Dog in his Ear.

Another Biting upon a Dog.

The Biting of a little Dog.

Another Dog bit in the Tongue.

Ch. III. Experiments of the Biting of a Viper made upon Pigeons and Puklets.

Ch. IV. Of the Poysen of a Vipers biting, and of its operation.

Ch. V. Experiments of the yellow liquor contained in the little Baggs of the greater Teeth, made on several Animals.

Ch. VI. Experiments of the Gall, Eggs, Guts,

The CONTENTS.

Guts, Heads, and the Blood of a Viper made
on divers Animals.

Ch. VII. Sundry other Experiments made
upon Vipers.

Ch. VIII. General Reflexions on all those
Experiments.

Remedies drawn from Vi- pers.

Ch. I. Of the different choice that may be
made of the parts of Vipers.

Ch. II. Of the Use of the parts of a Viper,
as to its Nourishing vertue.

Ch. III. Of the Vertues of several parts of a
Viper in Physick.

Ch. IV. Of the Powder and Trochisques of
Vipers.

Ch. V. Of the Viper-Salt of the Antients.

Ch. VI. Of the Volatil Salt of Vipers; of
their Fix't Salt, and of the other parts
that are separated by Distillation.

Ch. VII. Of the Fixation of the Volatil Salt
of Vipers.

Ch. VIII. Of the vertues of the Volatil Salt
of Vipers, and, of what other parts are able

THE CONTENTS.

so doe, that are separated by Distillation.

Ch. IX. Of the way of using the Volatil Salt of Vipers.

Ch. X. Divers Remedies or Compositions, of which this Volatil Salt is the Base or ground.

FINIS.

ERRATA.

Page 13. line 6. read seen on. p. 29. l. 8. r. and
that. p. 95. l. 27. r. and the want of goodness.
p. 120. l. 5. r. the bitten animal wwould be. p. 126. l.
12. r. twice through, for, twice in the day-light. p. 163.
l. 12. r. adapt. p. 165. l. 1. r. with Salt and Dill. p.
172. l. 1. r. Simples be in.

(i)
THE
ANATOMY
OF A
VIPER.

*General Observations upon
this Animal.*

CHAPTER I.



Know not, what ground the Antient Writers upon this Animal had, to say, that in the Copulation, the Male did insert his Head into the throat of the Female, and there emitted his seed, thence falling into her *Matrix*, where she first did form Eggs and then Young Vipers: That the Female, finding a titillation from the emission of the seed, snapp'd off with her teeth the

B

head

head of the Male, and so kill'd him ; and that the Young Vipers , being ready to be brought forth , did pierce the Womb and the sides of their Damm , to make a passage for themselves ; so that by killing her, they revenged in some manner the death of their Sire.

I confess, that this Story, or Tale rather , having neither reason nor experience on its side, I cannot take the part of those Authors. I esteem , that a Viper, which is a kind of creeping Serpent , is indeed procreated by the conjunction of Male and Female; but this is done by means of the Organs designed for Generation ; of which we shall make a description in their proper place , and which this Animal hath common with all others , and that more in number , than most Animals.

The Viper differs from other Serpents , not only in this , that it creeps more slowly , and jumps not; but chiefly herein, that its little ones receive their perfection in the womb, and come forth alive after the usual manner ; whereas the Femals of other Serpents lay Eggs , which they incubate , and hatch , either in the Sun, or in their recesses.

The

The Viper is by many taken for an Image of malice and cruelty ; but in reality she is guilty of no such thing , if she be not hurt or vex'd ; for , if she be , she becoms furious , and bites very piercingly : but she never assaults Man or beast , except she be angred. And if at times it happen , that she bites some person or other sleeping in the field , certainly that Body must have thrust or otherwise hit her ; for else she would never have bit him.

It may very well be said , that by that means the Stratagem of *Annibal* succeeded , when he caused a quantity of earthen Pitchers fill'd with Vipers to be thrown into the Shipps of the King of *Pergamus* , his Enemy ; in regard that on the one hand the Pots being broken , did hurt and anger the Vipers , and stirr'd them up to bite whatsoever was within the reach of their teeth ; and on the other , the sight of these creeping Creatures , scattered about here and there in the Ships , frighted the Souldiers and disorder'd them , so that they could not fight.

Meantime a Viper attacks and kills those Animals , which she means to devour for her nourishment , as Spanish Flyes , Scorpions , Froggs , Mice , Moles , Lizards and the

like ; which she swallows whole , after she hath kill'd them with her bigger Teeth. The smaller prey she sends down whole into her stomach ; the bigger she partly lodgeth in her stomach , partly in her weasand.

There can hardly be made any perfect digestion in the Stomach of Vipers , both because the heat is there not well united , by reason of the great aperture , there is at the mouth , where the Oesophagus or Weasand ends ; and because they have not moisture enough to help the fermentation and the Concoction of food. But yet this hinders not * the conveyance of the Juyce and of the finest part of the swallow'd animals into all the parts of their body for nourishment : Which is not performed but in the space of many days , during which , the excrements and superfluities of the nutriment are carried into the Guts , whence the grosser parts of them are cast out again by the mouth. This we have lately observ'd in a great part of the body of a Lizzard , which a Viper vomited up twelve days after she was taken ; where we saw , that , of the head and of the fore-leggs , and of that part of the body contiguous to them , and which could

could conveniently be placed in the stomach of the Viper, there rested little more than the Bones; but that a great part of the trunk, together with the hind-leggs, and the whole taile, were in a manner in a condition, as if the Viper had swallow'd them that day, as appears in the 2d Figure. But we were surprised, among other things, to see, that the parts, which could not enter into the stomach, and had remained in the *Oesophagus*, had kept so long well, I mean, without suffring any alteration in the skin; although those underneath had contracted some lividnes, which perhaps was an effect of the venomousness of the biting.

Vipers can live for many months without any food, and after they are once taken, they eat no more, living then only upon the Air, they take in. And although they be greedy enough of Lizards, when at liberty, yet I have found, that having thrown Lizards alive into a barrel, wherein I kept a good number of living Vipers, and leaving them there whole davs and nights, the Vipers did no hurt at all to the Lizards.

The Substance of Vipers is viscous and compact, and perisheth not but very slow-

ly and difficultly. Their Skin is scaly, which defends them from the injuries of the Air, and maketh that the Spirits unite themselves so firmly to the body, that 'tis hard for them to quit it; and we see, that they remain yet many hours in the Head and in all the parts of the trunk, after tis dead, emptied of all the guts, and cut in many pieces: And this is the cause, that the motions and windings so long continue in them; that the Head is able to bite, and its biting as dangerous, as when the Viper was entire; and that the Heart, even after it is pull'd out of the body, and sever'd from the other inward parts, keeps its beating for many hours. Whence it may be concluded, that the Viper, which is composed of parts so closely united together, and in which are found such perfect Spirits, can impart to Man what it hath most accomplish'd and in so great abundance: So that we need not wonder, if we find the remedies, we draw from its body, are of a not-ordinary virtue.

A Viper voids not much excrement, and what she voyds is not offensive, whereas that of *Snakes* stinks much, and hath the smell of stale and corrupt Urine. • Neither

ther have we ever found any ill smell in opening the vessels, wherein we used to keep Vipers alive, unless some viper or other had been dead and putrifyed. For my part, I have never received any inconvenience from any ill air, which some pretend to issue forth at the opening of those Vessels.

Vipers make no holes in the Earth to hide themselves in, as other Serpents do; but ordinarily they hide themselves under stones or old ruines, where they may be often found heaped up and wound together in clusters. When 'tis fair weather, they love to lurk under bushes and tufted plants.

They commonly couple twice a year, the first time in the month of *March*; and they goe with their young ones 4. or 5. months; which being perfect, come forth one after another by the common opening of the *Matrix*, and in great number, even to twenty and twenty five. They draw out with them, in coming forth, a small tegument fastned to their navel, like an after-birth, which the damm by little and little separateth with her tongue, as they are born one after another.

Vipers cast a skin every Spring, and sometimes even in Autumne: which hath

occasioned a belief, that they have a virtue, able to make young again, and to preserve the strength of those, who use them either for a preservative or a remedy.

THE
DESCRIPTION
OF A
VIPER

CHAP. II.

*Of the Parts, which present
themselves first.*

SECT. I.

Of its external Figure.

THe Vipers, Males and Females, that we have in France, being of their full growth, are in the middle of their body

dy a good inch thick ; but that of Females is bigger , when they are with young , especially when the young ones are ready to come forth. They are commonly two good foot long ; and there are some , that are somewhat longer. Their head , which is flat , hath a kind of border round about the edges of its upper part , and in that they differ from *Snakes* , which have all that round bared and taken down , and the Head sharper and narrower , in proportion to their Body .

The Head of a Viper is in all an inch long , and towards the top thereof it is 7 or 8 lines broad ; and then lessening by little and little , it is not above 4 or 5 lines broad about the Eyes , and 2 lines onely about the end of the Nose . It is about 2 lines thick .

The Neck , taken where it begins , is about the bigness of a mans little finger . That of Males is ordinarily a little thicker than that of Females : Yet there are some of the Females , which , when full , appear to have a Neck even thicker than that of Males .

The Tail of Males is always longer and thicker than that of Females , because it contains

tains the parts of generation double; and in their Interstices there are also two small bladders somewhat long, serving for a reservatory of their seed, which make their Tail bigger. This of the Males is about four fingers square long; but that of Females not much longer than three. The upper part of the Taile of Males is, at its beginning, about the bigness of their Neck, and ends sharp, as doth also the Tail of Females. Neither of them stings, nor have they any venom in them.

S E C T. I I.

Of the Skin of Vipers.

NO Vipers are seen, but they have their skin spotted: but the ground of the colour is different enough; for sometimes 'tis whitish, sometimes reddish, in some 'tis gray, in others yellow, in others tawny. This ground is always speckled with black spots, or at least much darker ones than the rest; they appear like different cyphers or characters, ranged in spaces, even enough, and answering one another, especially on the top and the sides of the Body. Some of them are also upon

on the Head, and among the rest, two in the form of Horns, which take their rise between both Eyes, and open themselves and reach towards the two sides of the top of the Head, and are sometimes 4. or 5. lines long, each of them, and halfe a line broad. Opposite to the middle of these two horns, there appears a speck of the bigness of a small Lentile, being shaped like the Iron of a Pike: And this is that, which is, as 'twere, the first and principal of all these specks, seeming to guide them all along the Back-bone.

The Skin is all cover'd with Scales, the greatest, strongest and most considerable of which, are those under the whole Body, and some under part of the Head. Their bigness and force is necessary for them, to fortify the Viper in the place that is feeblest and least capable of defence; besides that they support the Animal, and serve it, instead of feet, for creeping, and for carrying its Body to and fro. These great Scales are alwayes of the colour of Steel, from one end to the other, and different from those of Snakes, which are commonly mark'd with a yellow colour. They open, and stick, according as the

Viper will recoyle, or stop. The extremity of these great Scales is, as 'twere, sow'd beneath the other little Scales, which cover the whole Body. Those under the Head, reach in their breadth towards the two Jawes; they are lesser, streighter and softer than those under the Belly, and terminate at other smaller Scales, which go on to cover the whole undermost part of the Head, and, beginning their ranks towards the ends before, continue them at the sides of those ranks as far as towards the bottom of the Jaws.

From the begining of the Neck unto the beginning of the Tayl, there are as many great Scales, as there are *vertebraes* or Joynts of the Back-bone; and as each *Vertebra* hath on each side a Ribb, each Scale meets by its two ends the points of both, and serves them for a defence and stay: the same abuts also on each side at the end of one rank of little scales, where-with the rest of the Body is covered, and it seems, that 'tis placed there to receive them. These small scales are admirably well ranged, they lying upon one another, and representing each as 'twere halfe a round towards their extremity. Their ranks appear

pear always sloping, whether you look on them from the right side to the left, or from the left to the right; some what after the manner of the ranks of small Slate, that are cut in a halfe round, in some places seen in the tops of houses. These Scales are more or less great, according as the part of the Body, they cover, is greater or lesse. The Symmetry of them is always very exquisite and even; and is suitable to the great Scales, united to their ranks beneath. There are also observ'd on the top of these Scales, and all along the Back, many fine and distinct Lines, passing streight along from the hind-part of the Head unto the end of the Tayl.

The Scales, that are under the Tayl from the beginning of it to the end, are divided, and yet they appear united and ranged in the middle by a very orderly and pleasing compartment; and their bigness goes diminishing in proportion with the Tayl.

The Skin of the Head is also covered with small scales, and at the end of the Nose turned up, and so on, even round about, as far as towards the Eyes, in the manner of a swines-snout.

There are observed only six openings in the

the Skin of a Viper : the biggest is that of its Throat ; the other four are those of the two Nostrils, and of the two Eyes ; the last is that, which is at the lower-most end of the Belly, where is the beginning of the Tayl, which incloseth not only the hole of the Gut for voiding the excrements, but also those of the organs of Generation, as well of Males as Females. This last opening is shut by the last of the great scales, which is advanc'd in the form of a half round, and opens in falling lower at the time of copulation, as it also doth at the time of the young Vipers being cast, and of the excretion of their dung. The Throat opens and shuts at the will of the Animal ; the Nostrils remain alwayes open, and the Eyes have Eye-lids to cover them upon occasion. There is no aperture in the skin to give any passage for Hearing ; Nature, it seems, serving herself of the apertures of the Nostrils for that purpose.

Vipers ordinarily cast their scaly Skins twice a year, under which they are furnish't with another, quite formed, which at first appears much fairer, and of a more vivid colour, than that which is cast off. And there is also insensibly forming an other

ther new one, against the time it is to serve, when that which now covers it shall be severed from it: So that a Viper hath at all times a double skin; and all these skins, though furnish'd with scales, are notwithstanding transparent, being held and look't on against the day-light.

This *External* description might be sufficient for those, who shall desire no more but to know how to discern Vipers from other Serpents, but the *Anatomical Description* of all the parts under the Skin will be much more satisfactory and more necessary for those, who shall desire to know exactly all the good and all the ill in a Viper.

CHAP. III.

CHAP. III.
OF the Parts of the Head
OF A
VIPER

SECT. I.

Of the Nose and Nostrils.

B Eginning at the extremity of the Head there are the *Nose* and the *Nostrils*. The former is made up of a Bone some what Gristly, furnisht with some ends of Muscles, that come farther off, and are accompanied with some small veins and arteries. This Bone is also cover'd with the scaly Skin, turn'd up, as was said above, at its extremities. There are two pipes, in the two sides, that form the nostrils, which have each a small and round opening on the right and the left side, before, and the proper nerve, which comes down from

from the fore-part of the Brain unto their Orifice, and communicates to them the objects of smelling. The same Pipes serve also to receive two small Nerves, which issue each from the lateral part of the Brain, and serve for Hearing. This gristly Bone hath several Angles round about, and is articulated by two strong Ligaments within and about the hollow and anterious part of the Skull ; which hinders not, but that it is a little flexible in this Articulation.

S E C T. 2.

Of the Skull.

THe *Skull* is found hollow in the fore-part of it, and represents the shape of an Heart in this Cavity, when the Bone of the Nose is separated from it. There are two points advancing, which in part embrace that Bone ; it is in the superior part surrounded with a small border, advancing in the fashion of a Cornishe ; it is notch'd on both sides, where the Eyes are scituate, and there forms their round holes, of which the hind-part reaches out to a point, to which answers that before. The whole Skull in

all its parts is of a very compact and hard substance. There are three principal Sutures in the part above ; the one, which may be call'd the *Sagittal*, which divides long-wayes the part above the two Eyes ; the second, which may be term'd *Coronal*, divides the Skull a-cross behind the two Eye-holes ; the third, separates it also cross-ways near the beginning of the Back-bone. In the Surface of the upper part of the Skull, may be observ'd the figure of an Heart well represented, seated in the middle thereof, which hath its *basis* near the Suture *Coronal*, and carries its sharp end towards the hind-part of the Skull, which is sever'd by the third Suture.

There is also another great Suture, round about the nethermost lateral parts of the Skull, by which it may be divided into two bodies, an upper and lower. This latter is made in the form of a turn'd back, going long wayes, hollow in the middle, and representing the shape of a Culter, which hath a kind of little wing on its sides, and whose point advances beneath the middle of the Eyes. Its latter part descends as far as the bottome of the Palate, where it hath in its lower part a point descending

descending in the form of an overturn'd hillock.

All the Sutures of the Skull are so well united in their conjunction, and so strongly connected, that 'tis very hard to distinguish them, and yet more to separate the parts of them without breaking them, unless the Skull be boyled in some liquor.

S E C T. 3.

Of the Brain.

THe substance of a Vipers *Brain* is divided into five main Bodies, of which the two first are oblong, each of the size and shape of a grain of *Succory-seed*. They are seated long-wayes between the two Eyes; and 'tis from these Bodies, that the *Olfactory Nerves* do proceed. The three other are in the middle part of the Skull, and under that figure of the *Heart*, of which we have been speaking. Each of these Bodies is near as big as a grain of the *Seed of Milium Solis*, and represents almost the shape of a *Pear*, the point of which is turned towards the fore-part of the Head. Two of these Bodies are seated in the up-

per part long-wayes, and one on the side of the other; the third, which is a little less, is placed under the middle of the two, and may be call'd the *Cerebellum*, or little Brain.

The *Spinal Marrow* seems to be the same body with this last, although it have a separate place in the hind-part of the Skull. It is of a substance somewhat whiter and softer than the Bodies, we have been just now speaking of, and of the size of a small grain of Wheat. It produces a Body of the same substance, which extends it self long-wayes, and passing in a strait line thorough all the *Vertebra's* or Joints of the Back-bone, terminates at the end of the Tayle.

The Bodies of a Vipers Brain are cover'd with a coat, thick enough, and sticking fast enough to them, which may be called the *Dura Mater*: It is black, whence it hath hapned, that some Authors, not taking the pains to look under this Tunicle, have affirm'd, that Vipers Brains were black. Under this *Dura Mater*, each Body of the Brain, separately, hath also a little membrane involving it, which may be termed the *Pia Mater*. There are observed some small interstices betwixt these Bodies, and even

even in the Body of the Spinal Marrow, which might pass for *Ventricle*s: And I doubt not, but that, if the Subject were a little bigger, we might observe in it most of the considerable parts, that are to be found in bigger Animals.

S E C T. 4.

Of the Eyes, and their principal parts; as also of those, that serve for Hearing.

THe Eyes of Vipers are very quick, and their aspect is exceedingly fixt and bold. They have their Nerves, Muscles, Veins, Arteries, Apple, Chrystral-lin, Uvea, Cornea, Eye-lids, and the other parts, like enough to those of the Eyes of other Animals.

The most considerable Nerves are the *Optick*, which parting from behind both the Eyes, do meet together and conjoin laterally at the beginning of the Little Brain, and there make as it were the figure of an X, and opening themselves after this conjunction, they encompass that little Body by the sides thereof, and render themselves at

C 3 the

the beginning of the Spinal Marrow, which receives them.

The smallness of all the other parts being such, as that it maketh their examination difficult, and we having not been able to find any thing particular in them, I esteem, that as it would be very troublesome to make Researches thereof, so it would be to no purpose, to make a description of them.

The two upper Bodies of the Brain send each from their lateral fore-part a small Nerve, which piercing the Skull, runs along the Temples, where it joins it self to the *Salival Glands* (whereof we shall speak hereafter) and following them, it passeth under the Eye, where it divideth it self into two branches, of which the chief inserts it self into the Bone and the Conduit of the Nostrils, to serve for the Sense of Hearing, and the lesser descending towards the Teeth, called the Dog-teeth, it ends there, after it hath divided it self into several branches.

S E C T.

S E C T. 5.

Of the Bones of the Head, that are
jointed to the Skull.

ON each upper side of the middle of that Heart, which is seen above in the Skull, there is a little flat Bone, a matter of a line and an half long, that is firmly articulated to it, which following and adhering to the same side of the skull as far as to its hind-part, becomes to be articulated anew to another flat Bone, longer and stronger, and forming there as 'twere an Elbow. This latter Bone goeth downwards, and is strongly jointed to the inward end of the lower Jaw; in the middle of which articulation, the upper Jaw terminates, and is there jointed, but not so firmly, because it hath other articulations, which the lower hath not. These Bones, which are like *Clavicles*, serve both for a support to the Jaws, and to open and shut them; and for this purpose they are assisted by the Nerves and Muscles, which Nature hath provided them with.

There is also at each advancing end of the Eye-hole a little flat Bone, being about a line and an half long, which is strongly articulated with the root of the Dog-tooth, and by its other end is also firmly jointed to the middle of the upper Jaw, as well to support it, as to make it advance together with the great Tooth, when it is raised to bite.

The upper Jaw is divided in two, before, and is separated, by the gristly Bone, from the Nose, where its two ends are articulated on each side. These two Jaws are much more inward than those below, and the great Teeth are seated without their rank, and at their side, tending outward, and do serve them for a defence. They are made up, each of one only Bone, that is about six lines long.

The lower Jaw is also divided in two. These Jaws are annexed, before, one to the other, by a Muscle, which opens or shuts them at the pleasure of the Animal; and they have no other articulation but that, we have spoken of about their inward end, *viz.* with the Clavicle coming down from the Skull, and with the inward-end of the upper Jaws. Each of these Jaws

Jaws is composed of two Bones, articulated together towards the middle of the Jaw ; that which is before, embraces above and below that which is behind, and can bend it self outward in this place, when the Viper will bite, and is a little curved inwards toward its extremity ; and 'tis upon this Bone alone, that the lower Teeth are fastned.

S E C T. 6.

Of the Teeth.

THe Opinions of the Antients have been very differing about the number of the great Teeth of Vipers, and most have held, that in this the Female exceeded the Male, and that the plurality of the great Teeth was the chief mark, whereby to distinguish her from him. I have been careful to inform my self about it, and have taken pains to grovel with a great deal a patience in the gums of innumerable Vipers ; but all being well examined, I have not found, as to this point, any true difference of one Sex from the other, but sometimes more, sometimes less Teeth in one and the other.

other. I have casually met on each side with two great Teeth fixed, placed very near together, and on the side of one another, as well in Males, as Females; but in most of both Sexes I have found only one, fixed on each side, cover'd, to two thirds of their height, with a Tunicle or Bag sufficiently thick, fill'd with a yellowish juyce, which is transparent and pretty fluid; and in this Vesicle, in the midst of this juyce, and under the great and main Teeth, a differing number of Teeth ill set, some longer than others, and all hooked, of which I have counted, in several Vipers, from two to five, six and seven, on one and the same side, under the self-same Tooth, and in the same Bag.

These great Teeth are only in the upper part, standing on the side, and without the Jaws of the Animal, where they are like Bulwarks. They are about two lines long, hooked, white, hollow, and diaphanous throughout, as far as to their sharp point, which is very subtle and exceedingly piercing. They have many little Cavities towards their Root, in which the other Teeth are planted. These Teeth commonly remain lying along the Jaw, and their

their point appears not but at the moment the Viper will bite ; for then it raiseth them, and advanceth them jointly with the upper Jaw, drawn by the Bone, which at one end is articulated in the middle of it, and at the other, to the root of the great Tooth.

The yellow liquor, contained in the Vesicle, serveth not only to moisten the ligaments, and to make them fit for the bending of the Teeth, but also to nourish them, and to make those grow, that are there as 'twere in a Nursery, and are, if we may say so, in expectation to serve instead of the many Teeth, whether these come to fail in their force, or fall out of themselves.

All the Jaws, both upper and lower, are fortify'd with bent Teeth, that are hollow, pellucid and sharp, as the bigger Teeth, but that they are much smaller. Their number is uncertain enough, whether it be, that Nature produces sometimes more, sometimes less of them, or that that fineness maketh them apt to break. There is little difference, as to the number, in those above from those below. Ordinarily there are eight Teeth in each Jaw, but at times I have found nine, ten, eleven in each. Those that

that advance most, are a little bigger than the deepest ; and just as those below answer in scituatiōn to the Dog-teeth, that are above them, they have at the end of each side one Tooth, that is a little bigger than all those of the other Jaws, and another, lesser, at the side, at the end of the part bent inwards.

There is a great difference in the Teeth and Jaws of Vipers, from those of Snakes : for, *these* have no Dog-teeth ; and although their Jaws are all divided in their foremost part like as in Vipers, yet they exceed them in the number of Jaws, and in the number of Teeth ; for, they have four Jaws above, and two below ; two of those above are situated all along and close to the rim of the Lip, and serve for a defence to the two other Jaws, that are seated in the same place, where those in Vipers are. Besides, I have counted 13 Teeth in each exterior Jaw above, and as many in each of the Jaws below, and 20 in each superior inward Jaw ; so that I have counted of them to 92 Teeth in one Snake, and all these Teeth are bent, fine, hollow, white and transparent, like those in Vipers.

S E C T. 7.

Of the Nerves, Veins, Arteries and
Muscles of the Head in general.

The chief Nerves in the Head of a Viper are, first, those of which we have spoken, namely those of the Smell, the Sight and the Hearing. Besides, there are those of the Taste, that which may be call'd the sixth *par vagum*, which is afterwards distributed into all the vital and natural parts ; and those, which issuing from the Spinal Marrow are carried through the whole habit of the Body. There are also many Nerves, that go from the inferiour part of the Brain, and pass through the Skull, but by reason of their subtility and finenes, 'tis hard to follow them to their insertion.

There is yet another Nerve that is considerable, which proceeds from the Skull, behind that of Hearing, which leaves, in the space between, a small *Apophysis*, or Process, or Knot, in the Skull, and which, descending along the Clavicle, runs upon the superiour Jaw, and is inserted in its middle ; then

then it goes on in the middle to its extremity, and distributeth it self into all the Teeth, fix'd there.

The Head hath also its Veins and Arteries, which coming from the Liver and the Heart, distribute themselves there into an infinity of branches, by which all those parts are bedew'd. It is also provided of many Muscles, at the sides and below the Skull, and about the Clavicles, and superiour and inferiour Jaws, that serve not only to fill up the Cavities of the Skull, and to cover the Bones that are articulated there, but to give motion to all the parts that need it: to which also the Nerves contribute their share.

SECT. 8.

Of the Salival Glands of a Viper.

THe Opinion of the Antients, That the seat of the Vipers poyson was the *Gall*, and that from thence it ascended into the Gums, by vessels odly enough fancied, hath seem'd to me too far from all probability to follow it. I therefore thought, that that particular did very well deserve

deserve a strict enquiry, and that it was of moment to discover the Truth thereof. On the other side, the curious Observations, made on this Subject by Signor *Redi*, a Florentine Philosopher, whose merit is known and esteem'd by all the Learn'd, seemed to me, as to all those that have seen and examin'd them, not only reasonable and possible, but I was altogether perswaded of the candor and ability of that illustrious person. Upon his Accompt and Relation, I never scrupled to taste often of the gall of Vipers, as well as of the yellowish liquor, contained in the bags of the Gums; and I have found in both the Truth of what he hath observed thereof, namely a great bitterness, and a great sharpness in the Gall; and the taste of a *Saliva* or Spittle sufficiently flat, and approaching enough to the taste of the Oyle of sweet Almonds, in the yellow Liquor of the Gums.

These great differences of the qualities in the one from the other, made me believe that there was a great diversity in the matter of them, as well as in their source; and I believed at first, following Signor *Redi*, that there might be *Salival* Vessels in Vipers,

pers, as there have been lately found in Man, and divers other Animals; so that after many researches, made with attention and patience enough, in many Vipers Heads, I discover'd at length such *Glands*, proper to form this juyce, and to convey it to the Gums; and after I was well perswaded of it my self, I shew'd them to divers of those knowing Physitians, that had met at my House the last Year. These persons had a mind to see with their own Eyes, and after they had well examin'd the parts which I shew'd them, they not only found them true, but they there also saw a greater number of smaller vessels, than had appear'd to me, of which some, that are Arteries and Veins, pass above the *Glands*, and others, that are *Lympheducts*, run below: so that they judged, that I could confidently assert and describe these *Glands*, which I call *Salival*, and which they had acknowledged together with me; though Signor *Redi* durst not speak *positively* of them, because he had not discover'd them, neither had they been described by any Author of their knowledge, nor by any one of mine.

These

These *Glands* are found in all the Heads of Vipers, both Males and Females ; they are seated on both sides, and joining to the Skull, in the hind-part of each round of the Eyes, and at the same height with them. There are many small ones join'd together, which may be call'd *Conglomerate Glands*, which are easily distinguishable by their form and colour, which is different from the Muscles, neighbouring to them, and of which there is one, that may be call'd *Temporal*, which in part covers them by its extremity. This heap of *Glands* appears there of the bigness of the neighbouring Eye, and extending it self in length, continues its progress in the Orbite of the Eye, below, and in part behind the Eye. Each *Gland* hath its little *Lymphatique Vessel*, which parts from it as from a little Teat, and goes disgorging it self into a greater Vessel, that runs all along and under these *Glands*, and passeth into the Vessel of the Gum, and terminates in the midst of the Articulation, which the root of the great Teeth maketh with the advancing corner of the said Orbite, and with the little Bone, which by its other end is articulated in the middle of the upper Jaw. This

D principal

principal vessel, which, being considered alone, is very little in appearance, but is not so in effect, seeing it receives the discharge of all the small vessels, that come from each *Gland*, empties it self into the Bag of the Gums, and carries thither that *Salival Juyce*, which may have qualities approaching to those of the *Saliva* or Spittle of man, or of the foam or drivel of divers other Animals.

The Nerve, which serves in the Nostrils for the faculty of *Hearing*, runs for some space along these *Glands*, which are also, as I have already said, small Veins and Arteries.

But having well considered the substance, quality, and situation of these *Glands*, we judged their formation not to be in vain; but that their Use, in all likelihood, was to receive the humidities both of the Brain, the Eyes, and the neighbouring parts; and that their discharge was very convenient and even very necessary to the parts, which receive that liquor, as well for moistening the ligaments of the great Teeth, and to keep them in a condition of bending, at such time when the Viper will bite, and to increase the Teeth,

Teeth, which Nature hath made and set
in the midst of this Juyce.

For the rest, examining and tasting the *Glands* as well as the Juyce, we found a Taste altogether like that of the Gums, which Signor *Redi* hath described, namely very near the taste of the Oyle of Almonds, without any bitterness, though it leave, a while after, a little acrimony in the mouth, such as may be discerned in all kind of Spittle.

As to the small *Glands*, which Signor *Redi* hath observed at the bottom of the Vesicles that contain this Juyce, I can say, that I have with great care and diligence searched them, and that, 'tis true, I have there found the appearances of *Glands*, but having opened them, I saw nothing in them but small teeth which were fastned there, and are of the number of those, which I have called *Expectants*, without finding any thing of a Glandular nature there, nor that did, in the least, approach to the shape, substance or qualities of the *Glands*, which I have been describing.

The Viper is not the onely among Serpents, that hath *Salival Glands*; for I have

D 2 also

also found of them in the Head of Snakes, which Glands were heaped together long-wayes, and scituated near each outward upper Jaw, serving them for a defence, in a manner, as the Dog-teeth do to Vipers.

These considerations, supported by many Experiments, made by us, and to be related hereafter, have induced me to call these Glands *Salival*, and to ascribe to them the very source of that yellow Liquor, which hath been so much decryed, and with-all so little known, and is nothing else, but a pure and very innocent Spittle. I hope, that those, who shall take the pains of carefully examining, after me, these *Glands*, and this juyce of the Gums, will not stick to give me their suffrages.

CHAP.

CHAP. IV.

Of the other Bones of a VIPER, and the principal Parts, thence depending.

The great number of Bones, which rest in the Body of a Viper after those of the Head, consists only in the *Vertebra's* or Joints of the Back-bone, and the *Ribs*. These Joints begin at the hind-part of the Skull, to which the first is articulated; the other are ranged consecutively, strongly joined to one another, and they continue to the end of the Tayle. Every Viper, both Male and Female, hath an hundred and forty five *Vertebra's*, from the end of the Head to the beginning of the Tayle, and Two hundred and fourscore and ten Ribs, which is the double number of the *Vertebra's*; to each of which there are articulated two Ribs, one to each side, which are bent, and do

D 3 embrace

embrace the vital and natural parts of a Viper, and each point whereof rendezvouses at one of the ends of the great Scale under the belly, which is fit for both; so that there are as many great Scales under the belly, from the end of the Head unto the beginning of the Tayle, as there are *Vertebra's*, consorted by their two Ribs: Besides that, there are twenty five *Vertebra's* from the beginning of the Tayle to the end thereof; and those *Vertebra's* have not any Ribs, but, instead thereof, little *Apophyses*, or Processes, which lessen in their magnitude, as the *Vertebra's* do, tending towards the extremity of the Tayle.

There are four great Muscles, very firm and very long, which take their origine from the hind-part of the Head, and descend, two of them on each side of the Spinal Processes, one joining to the Spine, and the other to the side and a little below the first, which it accompanies all along unto the end of the Tayle. There are also two great Muscles of the like length, which are fastn'd to the inferiour part of the *Vertebra's*, and accompany them from one end to the other, as well as the superiour ones. We also observe, on each side, as many intercostal

cereostal Muscles, as there are any *Vertebra's*, serving for the same use, that those of other Animals do, which sever the Ribbs from the place of their root unto their point. All these Muscles are also accompanied with veins and arteries, as well as the greatest.

CHAPT.

CHAP. V.
*Of the other Internal parts of
a Viper.*

SECT. I.

Of the Tongue.

The Tongue, which the Viper darts out and draws in often and very quick, presents her self first of all. She is placed between the two Jaws below, and composed of two Bodies, fleshy, long and roundish, and terminating in very sharp and flexible points. These two Bodies are contiguous, and adhere to one another all along, from the place of their root as far as to the two third parts of their length. The inward half of these Bodies is of the colour of flesh, but the other half, I mean that which is often thrust out, is of colour blackish.

The Tongue may be, in all, an inch and an half long. Its root begins half an inch lower

lower than the bottom of the Throat ; and 'tis firmly annex'd, below the Neck, to two tendinous bodies, which are two or three lines long.

There are some Vipers, whose Tongues have three points, and some also, that have four. These points, though often darted out, prick not, nor hurt any body ; though perhaps they may frighten the ignorant. They chiefly serve Vipers to catch these small creatures, which they have a mind to devour. The Tongue is envelop'd by a kind of sheath from one end to the other.

S E C T. 2.

Of the Wind-pipe and the Lungs.

The Wind-pipe hath its beginning at the entrance of the Throat, where it presents a hole in an Oval, raised on high, and having as 'twere a little beak in its lower part. It is composed, at its entrance, of many gristly rings, joyned to one another ; which continue about the length of a good inch, and fall into the right side of the Viper, where they meet with the Lungs ; and from that place you see no more but the half

half rings turn'd upside down, which being joyned on both sides to the membrans, that depend from the Lungs, and which are annexed to it below from one end to the other, being assisted by the said Lungs, serve for Respiration, and continue their rank and their connexion, as far as to the fourth part of the Liver, which lies under it; as well as the Heart. The Wind-pipe is in all eight or nine inches long; and at the place, where its half rings end, it is united with a membrane, which attracts and receives the Air, as far as to the beginning of the intestins, where it forms, as it were, a roundish bottom of a sack.

The *Lungs*, being joyn'd to the Wind-pipe, and making with it one Body, are consequently situate, as it, on the right side. They begin, where the whole rings of the Wind-pipe do end. They are made in the form of a Net; they have no Lobes at all; they are red, very clear and very vivid, of a substance fine enough, sufficiently transparent and a little rough. They are fastned by Membrans to the upper part of the imperfect rings; being seven or eight inches long, and about one inch broad; and all over embroidered with veins and arteri-
es.

SECT.

S E C T. 3.

Of the Heart, and the Liver.

The Heart and the Liver are also seated on the right side of the Viper; and before the Heart there is, about the third part of an inch, a little fleshy and flattish body, of the bigness of a little pea, which is filled with water; this little body is placed under the Lungs as well as the Heart and the Liver, and is suspended by the same membrans, which support it: it may be taken for a kind of *Thymus* or kernel, and may serve for the same uses.

The Heart is seated about four or five inches below the beginning of the Lungs; of the bigness of a small beane: it is somewhat long, fleshy, and encompassed with its *pericardium*, which consists of a sufficiently thick tunicle. It hath two Ventricles, one on the right, the other on the left side: it also hath two apertures. The Blood, which comes from the *vena cava*, enters into the right ventricle, and being passed into the left, issues thence by the *Aorta*, which presently is divided into two great branches,

branches, one of which ascends into the upper parts, and the other, passing below the *Oesophagus* or *Wesand*, and taking its way sloping, subdivideth it self afterwards into many other branches, which spread themselves and are carried to all the parts, to the very end of the Tayle.

The *Liver* is a fleshy part, of colour red-brown, seated half an inch beneath the Heart, and supported by the same membrans: its length and breadth are unequal enough, but the greatest Livers, I have seen, are five or six inches long, and half an inch large. It consists of two great lobes of which the right descends a good inch lower then the left. These two lobes are bedew'd by the *vena cava*, which seems to separate them all along into two bodies, and which makes even a separation in their lower half, running in their interstice, and serving to joyn them together in one body: The upper half of the Liver is continued, and cannot be divided but by cutting it asunder.

The Trunk of the *vena cava* is divided into two branches in its upper part, of which the main and biggest endeth in the Heart, and the other passeth under the Lungs,

Lungs, and from thence into the superiour parts. This Vein in its inferiour part is di-vided into many branches, which descend into all the parts below.

A Viper is destitute of a *Diaphragme*, there being no solid traversing tunicle at all, that severs the vital parts from the natural: yet it may be said that that fine tunicle, which depends from the Wind-pipe and the Lungs, and goes down towards the Intestins, and there forms, as 'twere, the shape of a sack-bottom, may in some manner peform the function thereof.

SECT.

S E C T. 4.

Of the Gall, and the Pancreas, which
the Antients called the Spleen.

The Bladder of Gall is situate an inch below the Liver, and on the side of the bottom of the Stomack, and it leans to the left side. It is almost of the shape and bigness of a small Bean lying flat.

The Gall is very green; its taste very bitter and sharp; its consistence approaching to that of a Syrup not much boyled.

I have found in the Bladder of Gall but one out-let by a small vessel, which issuing from the inward side of its upper part, is bent from its origine, and descending, and adhering, even in its beginning, to the internal part of this Bladder, is afterwards divided into two branches, of which the principal and directest, passing through that Body (which the Antients have taken for the Spleen) runs into the Intestin, which receives it; and the other lesser branch, turning about, seems to remount to the Liver, but dividing itself into many small branches, becomes so indiscernable, that it cannot be followed any longer. It

It is not here, that I will refute the opinion of the Antients concerning the Venomous quality they have ascribed to the Gall; I leave that for another place, where I shall endeavour to maintain the Balsamique quality of this Juyce, and shew, that 'tis free from all kind of poysion.

The *Pancreas* or Sweet-bread, which all Authors have called the *Spleen*, is placed near and a very little below the Gall, and on the right side of the Viper. It is of the bigness of a good Pea, of a seemingly fleshy substance, but indeed Glandular. Considering its situation (which is close to the bottom of the Stomach and towards the entry of the Guts) together with its kernelly substance, it maketh me believe, that 'tis rather a *Pancreas* than a *Spleen*: but yet I leave the decision of it to those, who shall take the pains to examine it.

SECT.

S E C T. 5.

Of the *Oesophagus* or *Weasand*, and
the *Stomach*.

The *Oesophagus* takes its beginning at the bottom of the Throat ; its situation is on the left side, and its passage directly on the side of the Lungs and the Liver, as far as to its union with the orifice of the *Stomach*. It is made up of one onely membrane, very soft, and easy to be extended, and which may be swell'd even to the bigness of two inches. It is this part, which first receives the animals, the Viper hath killed with its great teeth, and swallowed whole, it being proper for that purpose, both by its large capacity, and by its length, which is of a good foot.

The *Stomack*, which is next, is as 'twere sowed at its bottom, and seems to make but one Body with the *Oesophagus* ; but yet is much thicker, and composed of two strong coats, one within the other, and sticking to one another. The thickness of its coats makes, that it cannot be swell'd to the same bigness with the *Oesophagus* ; for

for it cannot much exceed the bigness of an inch. It is between three and four inches long; its orifice is sufficiently large, as well as its middle, but the bottom of it grows strecther, and is commonly very close and firm, not opening it self, but to eject its excrements into the Guts. Its internal tunicle is full of rugosities when 'tis empty, and in it there are very often found little worms of the length and thickness of small pins. The Stomach is seated on the left side, as the *Oesophagus*; but the bottom of it is turned towards the middle of the Body, to empty itself into the first Gut.

The length and capacity of the *Oesophagus*, and the largeness of the entry of the Stomach, are very well accommodated to the nature of the Viper, which sends nothing chew'd to the Stomach, but swallows Animals whole for its food; and when some of them happen to be longer than the depth of the Stomach, part of them stayes in the *Oesophagus*, untill the Stomach have extracted and sent away the juyce of the parts devoured, which it could hold; after which it receives those that stay'd in the *Oesophagus*. But this requires a good space

of time, in regard that the Stomach is not closed, and cannot gather any considerable heat to make a speedy digestion.

SECT. 6.

*Of the Intestins, kidneys, Fat, and
a Tunique wrapping them up
below.*

THE *Intestins* of Vipers are situate in the midst of the Body, under the Back-bone, and immediately after the bottom of the Stomach. I have onely observed three of them, of which the first and narrowst may be called the *Duodenum*; the second, which is larger, and full of many windings, may be called the *Colon*; and the third and last, the *Rectum*, which also is very large and very streight; and hath its aperture below and near the beginning of the tayle, at which the Excrements pass away.

These Intestins have, at their sides, *Testicles*, together with their vessels, both of the

the Males and Females, and the two bodies of the *Matrix* of the latter, which we shall speak of hereafter. They contain also the *kidnys* with their vessels, which part from thence, and are accompanied of their veins and arteries, as also all vessels serving for generation; and the Intestins themselves are not destitute of them.

The *kidneys* are placed below the *Testicles*; they are made up of many glandulous bodies, contiguous, and ranged long-wayes, one after another. They are commonly two inches and an half long, and two l nes and an half large upon the round, which is a little flat. They are of a pale-red colour. The right kidney is alwayes seated higher than the lower in both sexes. They have also their *Ureters*, at which they discharge the serosities near the extremity of the *Intestin*.

All the *Intestins*, the *Testicles*, and the *kidneys* are covered with a very white and very soft *Fat*, which being melted hath the form of Oyle. At times also there is seen in some Vipers a little Fat about the Heart, the Lungs, the Liver, but especially close to the Gall, and near that part, which some take for the *Spleen*, and others

for the *Pancreas*. All these parts are wrapped about with a strong Coat, that is firmly fastned to the extremities of the Ribbs, which might pass for the *Epiploon*, if the Fat were joyned to it: but as the Viper, which is a kind of Serpent, passeth not but among the imperfect animals, I shall not determine the name of this Unique, to which the more Intelligent may give what name they shall think most proper.

CHAP.

CHAPT. VI.

*Of the parts of Vipers, that
serve for Generation.*

S E C T. I.

Of the Parts of the Male.

THE Male hath two Testicles, which are somewhat long and roundish, and sharpen a little toward both ends. Their colour is white, and their substance glandular. Their length is unequal, the right being longer by an inch, than the left, and this also somewhat less in thickness. They are not thicker than the quill of the wing of a great Capon. Their situation is different; for, the right begins near and beneath the Gall, whereas the left begins about eight lines lower than the right. They are both suspended in their upper part by two strong membrans, coming from below the

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Gall,

Gall, and are ordinarily covered with fat, which maketh them hardly discernable, by reason of the likeness of colour they have with this fat.

From the midst of each of these Testicles, from the inward part, one may see issue forth a little Body, long and slender, solid enough, and even somewhat whiter than the substance of the Testicles, which descends, and is fastned to them all along as far as to their lower end. It may be called the *Epididymis*. There appears at the end of each, the beginning of a small stradling vessel, that may be called *spermatique* because of its office; which is a little flat, very white, and shining enough, and commonly filled with seed, having the form of a milky juyce. This vessel is sufficiently delicate, and winds in its passage, after the shape of many S's joyned together, very pleasant to behold. From thence it descends between the Intestin and the kidpey, whose *Ureter* it follows unto the hole of the last Gut, at which the Excrements pass away. It is also accompanied of veins and arteries from one end to the other, as well as the Testicles, and it ceaseth to be winding a little before it comes to the aperature

ture of the Gut. Each of these two spermatique vessels comes to rendevouse at its proper receptacle of seed; of which there are two, that may be called *Parastates*, which are like white kernels, each of the length, bigness and shape of a grain of *Carduus benedictus* seed. These kernels are seated longways below and between the two natural parts: they are always full of a milky juyce, and altogether like that of the spermatique vessels, just now described: and to furnish for ejaculation at the time of the *Coitus*, they transmit the seed, which they contain, into the ejaculatory pipes of the two natural parts, neighboring to them.

I may say on this occasion, that those who have taken these two Conservatories of seed for other Testicles, have much deceived themselves in the opinion, they have entertained, that, there being two natural parts, there must also be for each of them two testicles: But their substance being quite different from the true testicles, by us described, and their office being to receive, and not to form, we do not acknowledge them but for *Parastates*, which by little and little receive the Seed, sent thither by the Testicles, and reserve

serve it, and keep it ready for the time of copulation, and to perform that in a moment, and seasonably, what the spermaticne Vessels would not be able to execute so soon, nor so well, because of their length and windings.

The Male hath two *Penes*'s altogether alike, which being pulled out are each as long as the Tayl of the animal. Their origine cometh from the extremity of the Tayle, under which they are seated all along, the one by the other. They go increasing in bigness, as the Tayle does; at the beginning of which they end, and they have their issue near and at the side of one another, and close to the opening of the Intestin, which maketh in a manner their separation.

Each of these is composed of two long and fistulous bodies, seated together one by the other, and which joyn towards their top in one body, which is environed with its prepuce, and hath its Muscles *Erectors*, as many other Animals have. These parts are within full of many stings or pricks, very white and hard, and very sharp, so set, as that they have their sharp end variously turned; of which the bigness and thick-
ness

ness answers to the place of the natural part, where they are set, so that as the top is bigger and thicker, the said stings are so too; and they advance and appear not but when the prepuce, which covers them, shrinks down at the time of the animals disposition to the coit.

These natural parts are ordinarily hidden, and they swell not, nor come forth, but for the coit; unless it be, that, the animal being taken, they be forced out by pressing them; for in that case one may see them both come forth equally, each about the thickness of a *date*, and of the length of two thirds thereof, and their top is altogether covered and quite beset with these pricks, like the skin of a Porcupin; and these stings retire and hide themselves under the prepuce, when one ceaseth to press them.

The issue of these two parts is environ'd with a very strong and thick Muscle, to which the skin is firmly fastned, and in such a manner that it is very difficult to separate it therefrom: which same Muscle serveth also to open and shut the Intestin,

SECT.

S E C T. 2.

Of the parts of the Female Viper, that
serve for Generation.

The Femal Viper hath two Testicles, as the Male; but they are longer and bigger. They are seated on the sides and near the bottom of the two Bodies of the *Matrix*, and the right is higher than the left, as 'tis in Males. Their Substance and colour also are very like them. The right is about one inch and an half long, and two lines and an half large; the left is something less. They have their *Epididymis*, and their *Spermatique* vessels, that convey the seed into the two Bodies of the *Matrix*, and which are much shorter than those of the Males. Yet I observe, that these Testicles appear not always such in all Females, especially in those that are emaciated, either by sickness, or by long keeping; for, their Testicles shorten, streighten, and dry, like as in those, whose Eggs are already great; having observ'd, that in these the Testicles are much shortned and dried up, as also that they are descended lower, al-

although the right be alwayes found higher than the left.

The *Matrix* begins in a body pretty thick, which is compos'd of two strong tunicles, and which being seated above the intestin, hath in the same place its orifice, which is large, and doth easily dilate, to receive at one and the same time, by the same aperture, the two *Penes*'s of the Male, in the Copulation. This Body is about the bigness of a nail of a middle-sized finger, and is divided very near its beginning into two small baggs open at the bottom, and fram'd by Nature to receive and embrace the two members of the Male in the coit. Their interiour coat is full of rugosities, and very hard, as is that of the whole body, which we have spoken of; so that she suffers, and also feels pleasure from, the pricking of the little stings of the Male's members, without being hurt thereby, although their points be very sharp.

The *Matrix* begins by these two little sacks or baggs to be divided into two bodies, which ascend each on its side along the kidneys, and betwixt them and the intestins, as farr as to the bottom of the

Sto-

Stomach, where they are suspended by ligaments, which come from about the Liver, being also sustained, from space to space, by divers small ligaments, that come from the Back-bone. These two bodies are composed of two tunicles, that are soft, thin, and transparent, being one within th' other. Their beginning is at the bottom of those two small bags, which embrace the two members of the male, from whence they receive the seed each from its side, to breed Eggs of it, and so young Vipers, by the conjunction of their own seed, which the testicles send thither.

These two Bodies of the *Matrix* do ver-
y easily dilate themselves, that they may
contain many young Vipers, unto the time
of their perfection: notwithstanding the
opinion of some, who have affirm'd, that
the *Matrix* of a Viper had but one onely
body; that it was seated in the midle, and
all along the Back-bone, and that there
were in it distinct Bodies to hold the Eggs,
and the young Vipers, which bodies were
dependants of this *Matrix*. But, I believe,
that the ground of their mistake hath been,
in that those true bodies of the *matrix*, be-
ing very delicat and very transparent, espe-
cially

cially when they are swell'd and distended by the Eggs, or the Vipers, by them contained, have not passed in their opinion for true bodies of the *Matrix*, and that they have taken for it the intestins, which are seated in the middle, and appear pretty bigg and thick, and seem to make but one and the same body with the first thick body of the *matrix*, under which the beginning of the first intestin is fastned and seated.

The Viper is not the onely animal, that hath her *matrix* divided into two like Bodies, equally placed each on its side, and along the Guts, which separate them; for I have observ'd the same thing in many Snakes, which I have open'd purposely to know the truth hereof.

SECT.

S E C T. 3.

Of the Generation and Production of
young Vipers.

BY the particular description, we have
made of the parts serving the Viper
for generation, is is easy to renounce all
the Fables we finde in Books, concerning
the copulation of Vipers, and the produ-
ction of the young Vipers: so that I shall
not trouble the Reader any further with
them, but onely intimate, That by the
means of the insertion of both members
of the Male into the two baggs of the *Ma-
trix*; by the ejaculation of the Seed, made
of them both together, into the two bo-
dies of the said *Matrix*, which are united
at the bottom of the baggs; and by the
concurrence of the Femals own seed which
her testicles emit at the time of the coit;
the Eggs are first formed in both the bo-
dies of the *Matrix*: that each is covered
by its little tunicle; that the Eggs of each
body of the *Matrix* are altogether wrap-
ped up in one common membrane, com-
monly

monly called the *Ovarium*; that all is inclosed in its proper body, the *Matrix*; that the Eggs there take their increase; that the young Vipers are there formed and perfect-
ed; that thence they come forth one after another by the same passage, where the seed of the Male went in; and that they are produc'd alive, as many other animals, without any need of the intervention of the dam's death.

We can assure the truth of all these particulars, having verified them by an accurate examination of all the parts, at several times, and upon a great number of subjects; and having seen the extension and swelling of those two bodies of the *Matrix*, even at the time when the young Vipers were perfected and ready to come forth; and lastly having seen the passage free, by which they were to come abroad, and the young ones actually produced without any danger to the Dam.

We have noted, that the right body of the *Matrix* of the Viper is ordinarily fuller of Eggs and young brood, than the left; that the number of Eggs is pretty unequal; that at times there are twenty or twenty five, sometimes but half so many; that the young

young Vipers take their form and perfection in the Egg ; that there they are seated and entangled divers wayes, and after a very pleasant manner ; that they have each within their Egg a kind of after-birth depending from their Navil, by which they draw their food ; that in coming abroad they train it after them, and in part are encompassed with it ; and that their Dam frees them thereof, and cleanseth them by licking them when they are born.

But although we have, as exactly as we could, described all the inward and outward parts of a Viper, both of a Male and Female ; yet to the end that all may be the better understood, we shall address the Reader to the following Schemes, wherin he may see the same parts, we have just now described, represented and drawn to the life, together with their explication in the Tables accompanying them ; hoping, that he will there find satisfaction.

The Reader is desired to take notice, that, having on the Frontispice of this Book represented two Vipers, a Male and a Female, conjoyned tempore coitus, and there being in the exterior part of their Body no considerable difference in the one from the other, but in their Tayle, of which the representation may be seen separately in the second Figare; I thought it needless, to exhibit the whole Figure of a Male by it self; and have contented my self to have engraven the Female in the state she is at the time when she produceth her young ones, which is that, which seem'd to me the most considerable for her exterior Figure.

He will also find no fault with the Situation, in which the Viper is represented in the Cutt, at the time when her young ones come forth, since that besides the Symmetry, which hath been there industriously observ'd, it was also intended to shew therein the parts, that seem'd very necessary to me, and that could not be represented elsewhere.

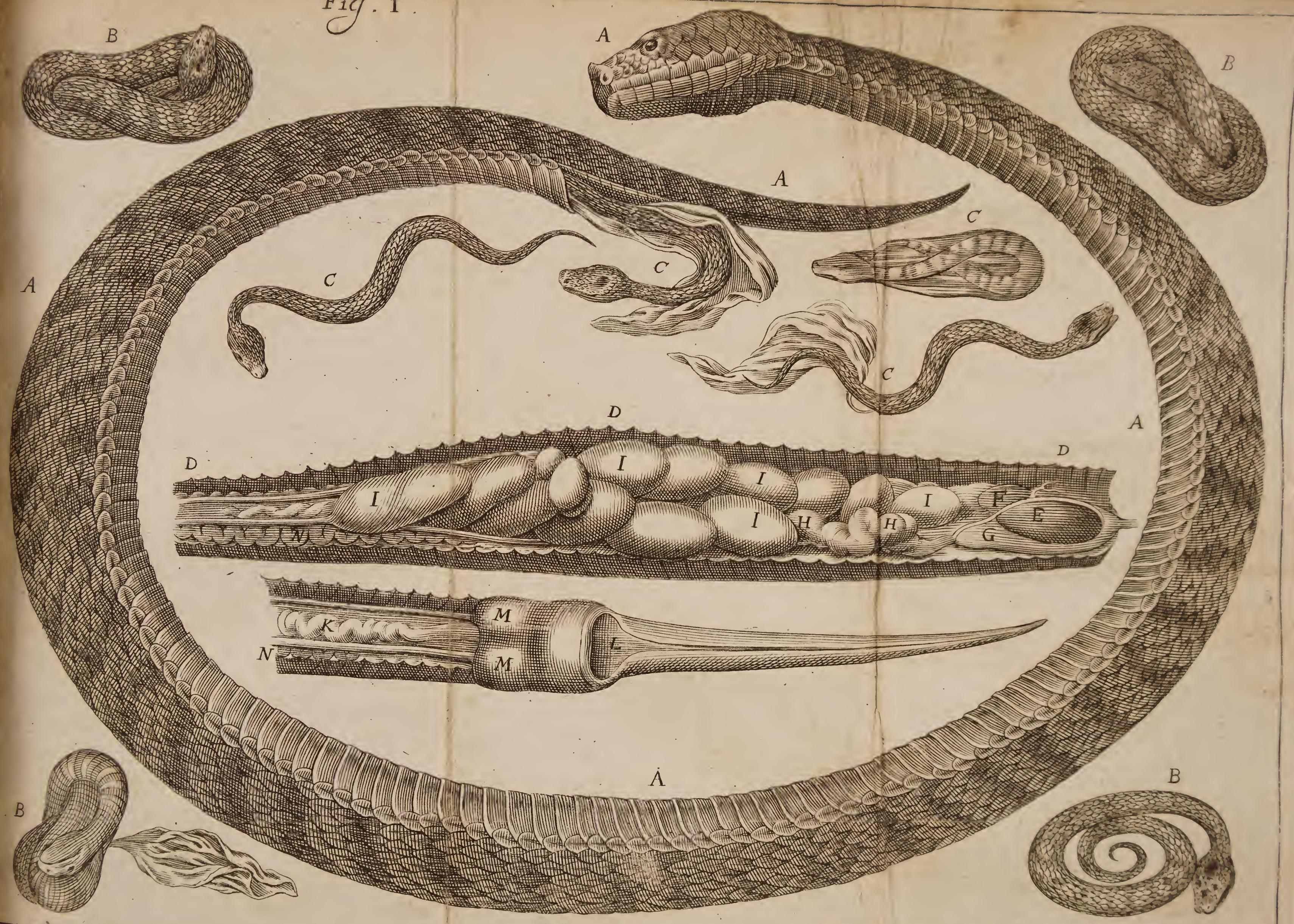
*The EXPLICATION of what is
represented in the first Scheme.*

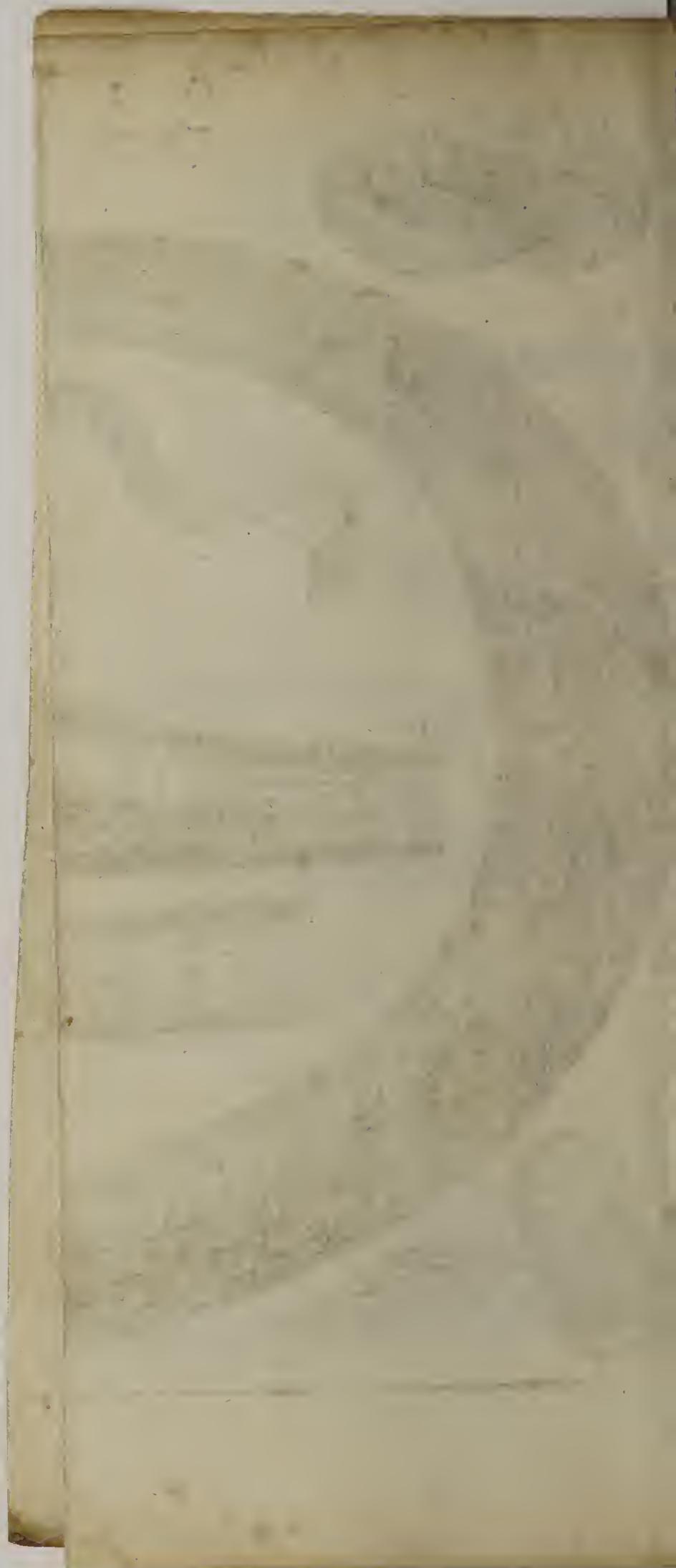
A A A. The Female Viper, bringing forth her young Vipers, exhibiting the lowermost part of her Body; where you may see the great Scales, on which she creepeth.

B B B B. Four young Vipers, each in one of the corners of the Cut, appearing wreathed, and in the same posture and situation, wherein we have seen them alive and ready to come forth; two of which appear without cover, one cover'd with its Coat, and the other having a piece of its After-birth depending from its Navel.

C C C C. Four other young Vipers, within the round, which the Viper formeth; one of which appears creeping, and clear of its Secundine; the other having it yet depending from its Navel; the third coming forth, and training along with it the Secundine; and the last wrap'd about by it, and in the state, wherein it was, when ready to be born.

Fig. 1.





D D. A part of a Female Viper, represented open under the belly long-wayes, and turned upside down, from the place of the Gall, unto the Orifice of the *Matrix*.

E. The Gall.

F. The Pancreas or Sweet-bread, which many have taken for the Spleen.

G. The bottom of the Stomach.

H. The beginning of the Intestins.

I. I. I. The Eggs contain'd in the two bodies of the *Matrix*, but being found in a far greater plenty in the right, than the left body.

K. A part of the last Gut.

L. The Orifice of the *Matrix*, and of the Gut.

M M. The two little Baggs, which join to the beginning of the two bodies of the *Matrix*.

N N. A part of each of the Kidneys.

The EXPLICATION of what is represented in the second Scheme.

A A. The first half of the body of a Male Viper, flead, turn'd upside down, and open under the belly from one end to the other, containing

B B. The Wind-pipe.

C C. The Lungs.

D. The Thymus or Kernel.

E. The Heart.

F. The Liver.

G. The great Vein, call'd *Vena cava*.

H H. The *Oesophagus* or Weasand.

I. The ascending branch of the *Aorta*.

L. The descending branch of the same Artery.

M. The Stomach.

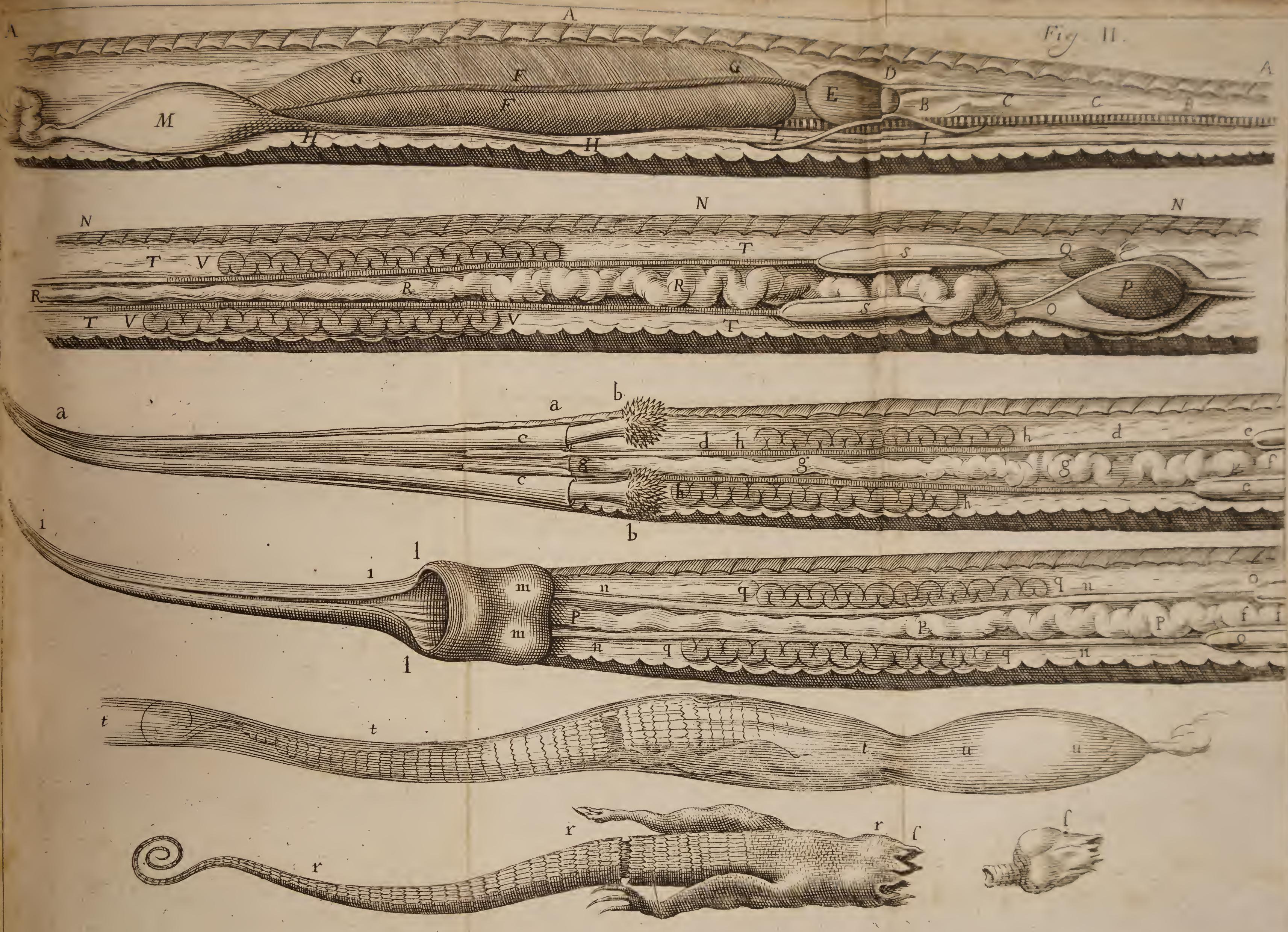
N N. The other half of the Body, in the same condition with the first, containing

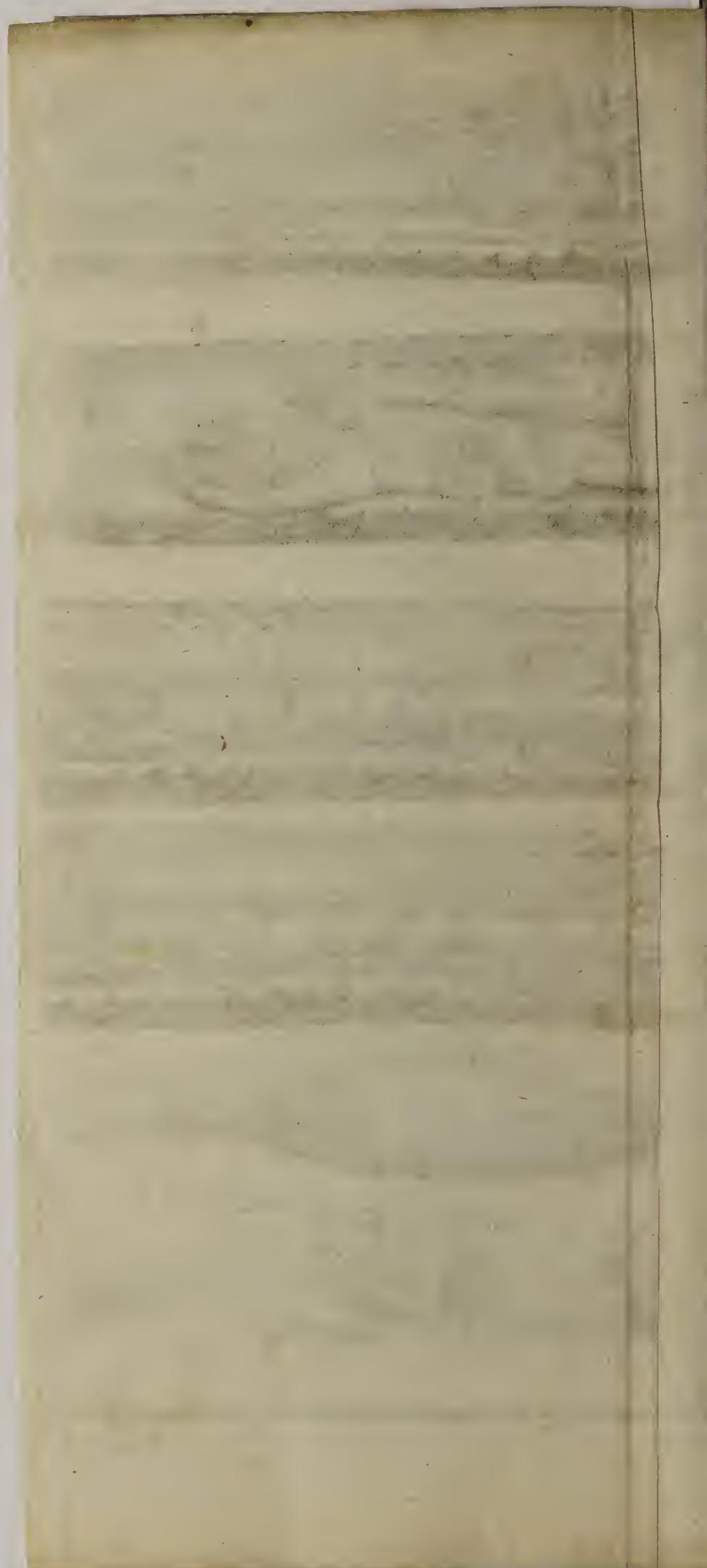
O. The bottom of the Stomach.

P. The bladder of Gall.

Q. The Pancreas, or, according to some, the Spleen.

R R R. The Intestins.





ss. The Testicles, together with their Epididymis.

TT. The Spermatick Vessels.

VV. The Kidneys.

aa. The Tayle of a Male, to which are annext the parts that follow.

bb. The two members of Generation, as they come forth at the time of the Coit.

cc. The two *Parastates*, or Conservatories of the Seed.

dd. The two Spermatique Vessels.

ee. The two Testicles.

ff. The two Epididymes.

ggg. The Guts.

hh. The two Kidneys.

ii. The Tayle of a Female, to which are join'd the parts following.

ll. The Orifice of the *Matrix*.

mm. The two small Baggs.

nnnn. The two bodies of the *Matrix*.

oo. The two Testicles with their Epididymes, and Spermatique Vessels.

pp. The Intestins.

qq. The two Kidneys.

rr. A great part of the body of a Lizard, of the same length and bigness, it

was vomited up by a Viper, many dayes after this had been taken.

s.s. The rest of the Head, and the rest of the Fore-legs of the same Lizard, cast up at the same time.

t.t. The *Oesophagus*, that had contained the said great part of the Lizard.

u.u. The Stomach, that had contain'd, and by little and little extracted the juycie substance of the rest of this Animal's body.

The EXPLICATION of what is exhibited in the third Scheme.

A. A whole Sceleton of a Viper.

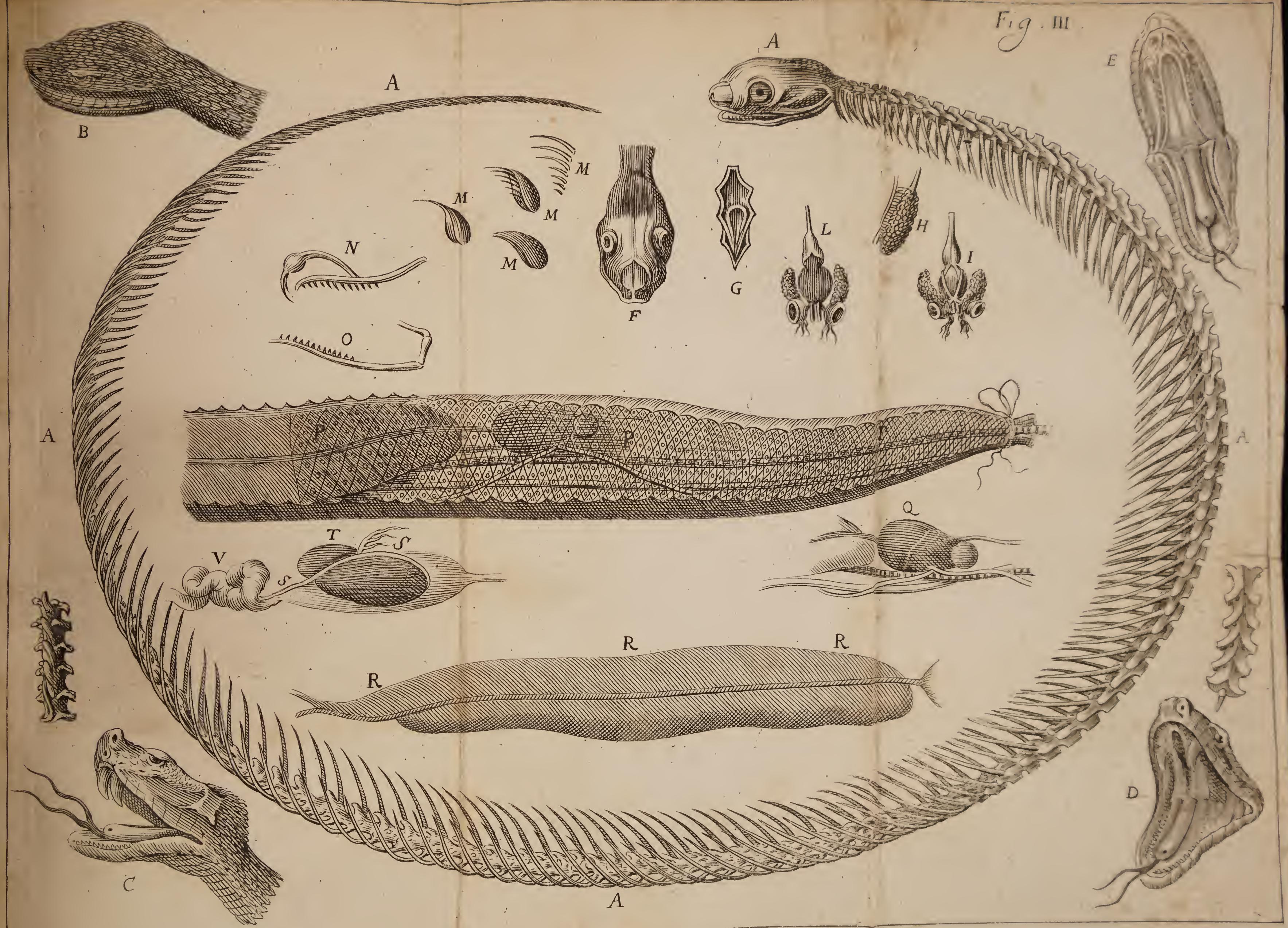
B. The Head having its Throat closed, represented with a part of its Neck.

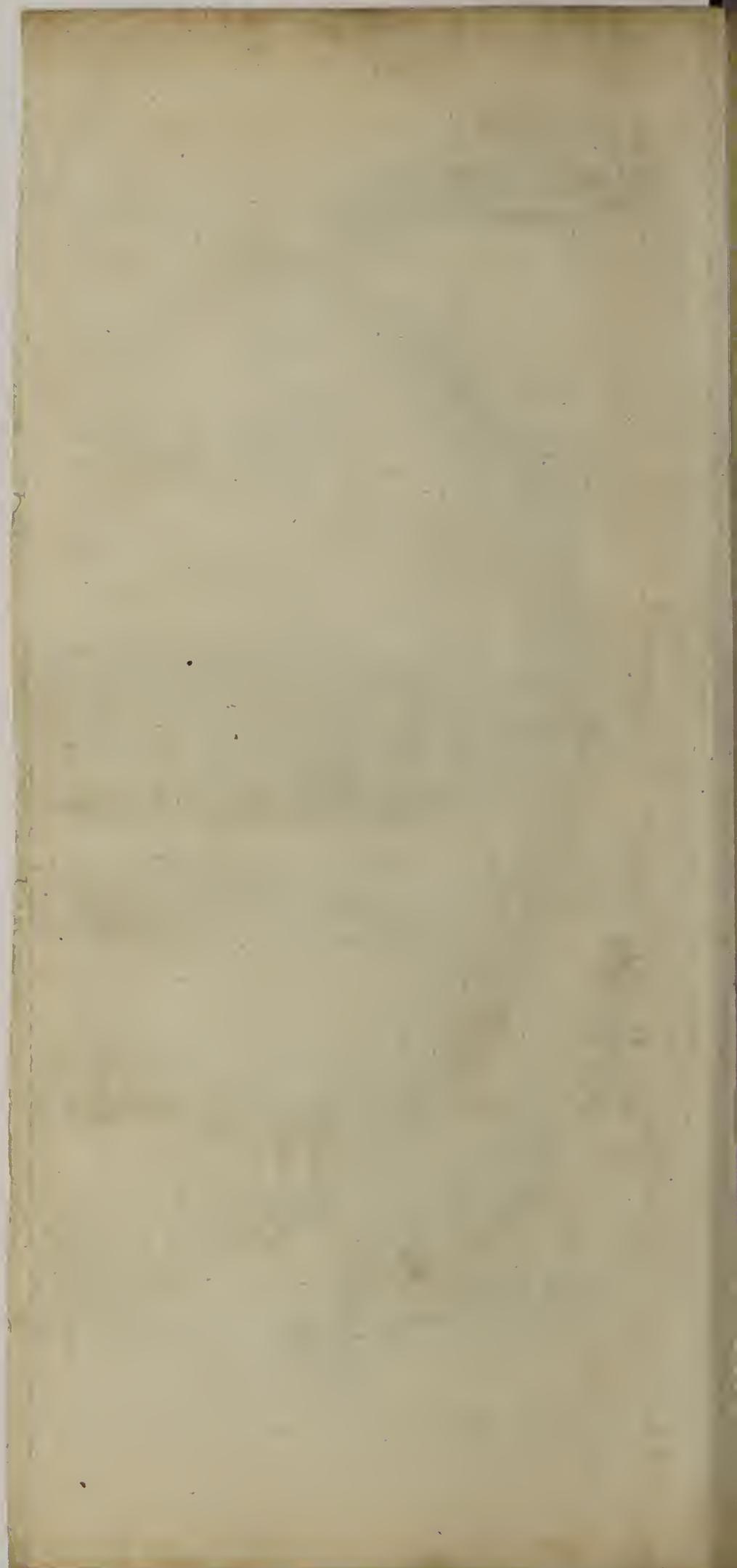
C. The Head having its Throat in part open, Head on its side, and there presenting the *Salival Glands*, together with their *Lymphatick vessels*, above the great Teeth.

D. The Head without Neck, represented with the Throat open.

E. Another Head without Neck, more open, and distinctly shewing all its internal parts that can be there represented, and which

Fig. III.





which may be easily understood in reading the places, where I speak of them.

F. The whole Skull of a Viper.

G. The inferiour part of this separated Skull.

H. The conglomerate *Salival Glands*, represented with their *Lymphatick vessels*, a little bigger than the natural, to make them the better to be understood, and as well as their smallness permits.

I. The same *Salival Glands*; the two Eyes with their Optick Nerves; the five bodies of the Brain, and that of the Spinal Marrow, adhering together, sever'd from the Crane, and represented by the face above.

L. The same bodies joined together, represented by the face below.

M. Divers great Teeth, some by themselves, some in their bag, others accompanied by the Teeth *Expectants*, which are set beneath them in the same bag.

N. The upper Jaw articulated to a small bone, which by its other end is articulated to the root of the great Tooth.

O. The lower Jaw, consisting of two bones, and articulated to the lower bone of the Clavicle bent like an Elbow, which de-

pends from the posteriour lateral part of the
Skull.

P. The Lungs with the Wind-pipe
without the body.

Q. The Heart in its *Pericardium* or in-
closing Membrane.

R. The Liver separated in two Lobes
by the *Vena Cava*.

S. The bladder of Gall, with the vessel
that carrieth its juyce into the Intestins.

T. The *Pancreas* or Sweet-bread, which
some take for the Spleen.

U. The Intestins.

EXPERIMENTS

EXPERIMENTS ABOUT VIPERS.

CHAPT. I.

*The Biting of a Viper, hapned
to a Man.*



N the Month of June of the year 1668, I procured a great number of live Vipers, Males and Females, to put the design in execution, I had purposed to my self; Which was, to know in truth all the good and all the evil, a Viper was capable of. I was happy enough in exciting the Curiosity of many intelligent Persons, and amongst others, of some Phy-

Physitians of my acquaintance, very knowing and sagacious, who were pleased to take the pains of coming to my house every day, to assist in these experiments, and to impart to me their directions.

The first Meeting of all proved a sad one by a surprising mis-fortune. A certain Forrainer, drawn to see our Experiments by his own curiosity, felt in his own person, contrary to his expectation, a great part of the grievous accidents, which may be caused by Vipers, and furnisht us, sore against our wills, with an Experiment, which was followed with circumstances too considerable to be suppressed; and I thought my self obliged to recite them first of all, because it was not onely the first, but the onely, that hath furnisht us with more remarkable things, than all the rest.

This Gentleman, of 25 years of age, had been by chance the day before at my house, when five or six dozen of Vipers were brought thither. He would needs see them immediately, and I, being desirous to satisfie his Curiosity, drew out of the Vessel one of the Vipers. He was not contented to see her, but took her in his hand,

hand, and kept her there for about a great quarter of an hour, suffering her to turn and winde herself about his hand and arm, the Viper not so much as offering to bite him: Then he tyed her about her neck, and so having hanged her, pulled off her skin, and emptied her of her Guts to examine them. I am assured, that he would have been soundly bitten at that time, if the Viper had been vexed; but not having been so, and being pleased to breath another air than that of the Vessel, where she had been long shut in, she let herself be tyed, after which she could not do that mischief, which certainly she would have done, if she had not been tyed.

But this proved quite otherwise the next day; for this stranger being come again to my house at the hour of the Assembly, he saw one of the Vipers upon the Table, which had been held a long while between Pincers, and was much angred. He would take her with his naked hand, though he was earnestly warn'd to forbear, it being represented to him, that he had been too bold already the day before. He had no sooner taken her in his hand, but she turn'd her head to bite him, and with one of her great

great bent teeth, she laid hold on the lateral inward part of his right thumbe, a little above the situation of the nail. The prick'g appear'd no more than that of a pin ; and it seem'd to us not deep, and on the surface we only saw a very small hole with a very little redness ; so that it was not discernable but by its colour. There was not *upon, nor about* this little hole, any sign of that yellow liquor contain'd in the baggs about the great teeth, and which is wont to be shed upon the wound, when a Viper biteth deep ; yet the prick'g caused some pain to him at the very first, but the finger swell'd not of it, no intumescence appearing but some hours after, as we shall relate more amply in the sequel.

It was found proper to scarify the part wounded, and to make strong ligatures above the place bitten, both to stop the effects of the Venom, and to discharge the wounded part of the same ; but the Patient opposed these means, not believing them necessary ; and he could very hardly be perswaded to endure any scarification ; after which, he endured also an iron spatule very hot and heated over and over again, held very near to the prick'g places ;

place; which was done, to keep the pores open, and to fetch back and draw out some part of the poyson: Meanwhile, we made the Patient take two drachms of Theriaque in half a glass of Wine.

In less then half a quarter of an hour after the pricking, the patient felt some debility, and call'd for a chair; he wax'd at the same time very pale, and his pulse was found very low, very quick, and even interrupted. These accidents were followed by convulsive motions, and by a stiffness of his whole body, and chiefly of his neck, and the muscles of his head: he then also complain'd of a very great pain towards his Navil; and there appear'd a coldness in his extreme parts, and in the whole face, which was covered with little drops of cold sweat: his lips also were swell'd, especially the lower. And finding himself urged by the pains about his Navil, and a disposition to go to stool, he rose, and having voided some excrements, he vanish't away, and at the same time vomited not only all the Theriaque he had taken, but all he had eaten at dinner, which was yet un-digested. We made haste to succour him, and found him so feeble,

ble, that he was not able to goe up again to the chamber, whence he was come down. And in regard his pulse continued weak, low, quick, and unequal, and his swoundings frequent, as well as his cold sweats, it was thought seasonable to give him a drachm of Viper-powder in *Theriacal* and *Carduus Benedictus* water, and to apply to him a great Plaister of Theriaque upon the Heart and Stomach, but he soon rejected what he had taken. One also came to give him some of the *Orvietan*, mixt with new powder of Vipers, but he vomited up that also, and desired to be put upon a bed, and to have other help administered to him. During all which time, he neither wanted his senses, nor the use of reason, notwithstanding all the feebleness of his Body; and he had had great aversion to the *Orvietan*, having no faith at all in it, and not consenting to take it, but out of respect to some of those that were present, who had pressed it upon him.

This vomiting not giving time to the remedies to convey and communicate their vertue to the noble parts, it was judged very proper to have recourse to the Volatile-

tile Salt of Vipers, because that being very volatile and exceeding fit to be quickly conveyed to all the parts, even the most remote, the Patient might thence feel the effects with more speed and efficacy, than from all the other grosser remedies, which having been rejected as soon as they were taken, had not had time to be made effectual by the stomach, nor to impart their vertue where need required:

We therefore caused to be dissolv'd a drachm of this volatile Salt of Vipers in Theriacal and *Carduus* water, and gave him about a quart of this mixture; he kept it a little while, and then cast up a part of it, mingled with store of phlegme very viscous. We made him take another like quantity of the same mixture, which he also kept for some time, and then vomited up, what might have remain'd of it in his Stomach, and amongst it much phlegm. We continued to give him still more of the same composition as fast as he vomited it up; and there were also given him several Clysters, to appease the violent and stubborn pains, which he felt about his Navel.

His lips remained still swolne, his pulse naught,

naught, and his sweat cold, as well as his faintings continued very long; but having persisted in the use of the Volatil Salt of Vipers, his vomiting ceased, and he kept the eighth dose in his belly, which was given him about four hours after he received the mischief: the symptoms lessen'd from that time, the cold began little by little to retire, and gave place to the natural heat, which appeared sufficiently about five hours after the pricking; his pulse returned, and was even and strong, but somewhat high.

It was about ten of the clock at night, that the most troublesome accidents disappear'd, the Patient was happy in his unhappiness, in being speedily and rationally succour'd. I left him not, before his mortal accidents had ceased; and then he was carried to his lodgings, whether I accompanied him, and he was put to bed; and by the advice of those persons, that frequently visited him during his distemper, I made a mixture of one drachm of Confection of *Hyacinthe*, and of as much of the Confection of *Alkerimes*, and of one ounce of Syrup of *Limons*, and of four ounces of *Carduus*-water, which was giv'n him

him at three times, from three hours to three hours. There were given him Citrons to smell to, and from time to time some slices of them sugred. He took good broths, and drank ptisan made with *Scorzona-roots*, and the shavings of Harts-horn, mingled with Syrup of Limons, he also drank sometimes a little wine, and there was dissolved of the Confection of *Alkermes*, sometimes in his broth, sometimes in his ptisane.

This is a thing remarkable enough, that during all the great accidents, his finger was not changed, and there appeared not any swelling upon it, but that began, when those accidents ceased. In the mean time, the pains about the navel continued, though they were in some little degree abated; which obliged the Physitians often to prescribe him Clysters. His belly was a little stiff, but not swelled; his tongue was whitish, but not dry; his eyes faint and wan; his countenance pale, and his lips still swelled.

The swelling of the finger extended it self that night over the whole hand; which was often anointed with the Oyl of Scorpions, composed by *Matthiolus*, and mixt

G with

with the *Queen of Hungarie's* water, but, notwithstanding this anointing, the tumor pass'd onto the arm the next day, with pain and redness, and advanced to the Eye. It was thought fit to apply fomentations made with the roots of *Angelica*, *Imperatoria*, *Carlina*, and *Aristolochia*, and with the tops of *Scordium*, *Centaurium*, *Wormwood*, *St. John's wort*, *Calamint*, boyled in White wine, and withal to continue the anointing with the said Oyle of Scorpions among these fomentations. Although this was done with great care, yet there appeared no great effect upon it; the Patient was squeamish, and once vomited up even his broth; but this vomiting continued not. He alwayes used the same internal and external remedies, and the same food; but although he found his other limbs in a good condition, and his pulse very equal and moderate, nor had any drought, heat, or pain in the rest of his body, yet was that of the Navil obstinate; and the swelling and the redness of the hand and arm still increased; and from the beginning of the third day, it had seised on the shoulder of the same side, and descended to the arm-pit, upon the whole breast, and all the neighbouring

bouring parts, and even the whole region of the Liver, notwithstanding the continual use of the fomentations, and the Oyle of Scorpions.

All these considerations, joyned to the hot season, wherein we were, made us apprehend, lest the gangrene should strike to those parts. It was believed, that, since the outward remedies which had been judged most expedient, had proved successless, recourse must be had to internal ones; which induced the Physicians to give him, in the evening of the third day, a drachm of the root of *Contra-yerva* in powder, dissolv'd in cordial waters, with as much confection of *Alkermes*: but we saw no abatement of the redness, swelling, or pain; on the contrary, we observ'd, that the swelling seem'd to seize on the left side.

After we had well examin'd all things, we found it very necessary to return to the use of our first inward remedy, which had struck the great stroke, and had had a manifest good operation; I mean, the *Volar-til Salt of Vipers*. This was in the morning of the fourth day after the biting. So we gave him half a drachm of that Salt, dissolved in four ounces of *Carduus* water, and

we order'd that he should be well covered, to make him sweat. This medicine did work according to our expectation and desire; for the Patient not onely did sweat abundantly, but found a very considerable amendment in all the ill Symptoms that had remain'd. His pain about the navil was almost not sensible; the tumor of his Lips, and that, which was in the region of the Liver, Breast, and under the Arm-pits, vanish't; and that of the shoulder, Arm and Hand was much abated, as well as the redness and pain.

We thence judg'd, that we should certainly cure the rest; and to compass it, we gave the next morning to our Patient a like dose of that Volatil Salt of Vipers, which made him sweat again very largely; the pain of the Navil ceased altogether; the swelling of the shoulder was wholly gone; and that of the whole arm and hand was yet much more abated, as well as the redness and pain. And not to leave the cure imperfect, though the patient found himself exceedingly amended, we gave him the next day another such dose again, and the day following one more, whereby the whole swelling, all the redness, and all the pain

pain of the arm, hand, and the finger it-self, were dissipated; Mean while there was applyed to the finger a little plaister to cicatrise the incisions, that had been made there, and which were healed three or four dayes after. Which did not hinder the Patient to goe abroad, and to doe his busines, as well as if he had never been bitten by the Viper.

Those that shall read this History, and examine all the circumstances of it, the several and surprising accidents of the biting of the Viper, which we saw, and the effectual operation of the remedies, employed to remove them, will therein find ample matter to exercise their reasoning upon, and will soon judge, that we had cause, accurately to inquire, as we have done, into all the parts of a Viper, *to* know them well, and what they can doe; *to* make a great number of Experiments upon all its parts, and *to* apply ourselves to the preparation of the excellent remedies, that may be drawn from the body of this Animal.

The Extraordinary effect of its Volatil Salt, in stopping and in overcoming, first of all the Venome, which so violently ex-

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ercised its tyranny over the natural heat, and all the noble parts, and which doubtless would have altogether triumphed over them: the activity, penetration, and force of the same Salt, going to find out the poyson, and expelling it from the remo-
test parts of the body, where it had fortified itself, and whence it endeavoured to regain the place it had lost, and where, in the mean time, it seem'd to despise the ordinary most powerful remedies. All this, I say, is sufficient to make it to be wondred at; and men will, doubtless, averr, that the ill, which Vipers are able to cause, and which every one may easily avoide, is nothing in comparison of such a remedy, as the same Vipers can furnish, and which may serve, not onely to heal their biteings, but also to overcome many other obstinate diseases, against which the ordinary remedies perform nothing; not to speak of many other good preparations, made of Vipers, which we intend to describe hereafter.

EXPE-

EXPERIMENTS

Of the Biting of Vipers, upon other Animals.

CHAPT. II.

Experiments upon Dogs.

THE effects, that are surprising, are wont sensibly to touch the Minds of Men; and they are they, which excite the Curious to inquire into the Cause of them; and although *this* do always precede *those*, yet it would not be known, and we should not so much as be aware that it was, if the effects thereof did not first appear. Being therefore to treat of the Biting of Vipers, we hope, it will not be thought amiss, if we begin with the recitation of the Experiments, by the Examples of its effects. And not

to be tedious to the Reader; having reviewed all that hath been experimented at my house, both the last and this year, I shall confine my self to what I think deserves most to be communicated, what serveth most to our purpose, and what may give most satisfaction to the Curious:

One of the most considerable Experiments was made on a *Dog*, which was bitten by an angered Viper at the upper lipp. The dog was not much moved at it at first, but little by little grew sad, and his jaw began to swell: a little while after he vomited up the last food he had taken, and danged. Then some bread, flesh, and water being offred him, he would touch none of it, he remain'd in a prostrate posture without complaining, the place of the pricking waxed livid, and this lividness extended it self to the neck, and as far as the breast, as did also the swelling. At length he dyed, but not till fourty hours were past after the biting. His belly appear'd not swoln, and without we observ'd nothing extraordinary but the tumour and lividness in the part prick't, and thereabout. The Dog being opened after his death, we found in the tronc of the

the *vena cava* a little bloud curdled, and we noted, that the rest of the bloud, in this place, in the heart, and every where else, was of a dark colour, and of a very ill consistence, as if it were blood in part dissolv'd and corrupted. The Stomach appear'd of a darkish colour, but the Mesentery and the Guts were darker. We found no alteration in the Heart, Liver, Lungs, nor the Spleen; all these parts being of a very fine colour, and in their natural condition.

The Biting of a Dog at the Ear.

THIS Dog howled from the time he felt the biting, and continued his howling for half an hour; then he ceased to howl and to complain. The place prick't wax'd livid, and swell'd, as also did the Neighbouring parts. This dog vomited not, but voided some excrements, which seemed natural. He would neither eat nor drink, no more then the first, and he soon dyed, having liv'd no longer then twenty four hours after he had

had been bitten. We saw outwardly nothing un-common, but the lividnes and swelling at the neigbouring part, and thereabout. But having opened him, we found all the inward parts in the same condition with those of the former dog. 'Tis true, we did not finde in this dog any coagulated blood, neither in the heart, nor the *vena cava*, nor else where, but it was of an obscure colour, and of an odd consistence, and in a visible disposition to coagulate.

Another biting of a Dog.

WE had a Dog bitten by an irritated Viper at the tip of his Nose, the dog howled, when he felt himself bitten, but was soon appeased, falling to lick the place prick't, and to scratch it with his paws. He lay not down, but continued for some time in that exercise, and went up and down in the chamber. The place bitten became somewhat black and blew, but swell'd not; and a little while after the dog drank and eat, as if he had never been

been bitten: The lividness disappeared little by little, and the Dog was as well as ever.

The Biting of a little dog.

A YONG Puppy, but 7. or 8. dayes old, was bitten in the leg by an enraged Viper; the dog began to howl as soon as he was bitten, and so continued till he dyed, which he did one hour after. The part pricked was swelled and livid, as in the former, and the animal being open'd, we found nothing extraordinary in his body, save onely some lividness in the Stomach and Gutts, and some blackishnes and ill consistence in the bloud, as in the others; for all the other inward parts appear'd to us very sound.

Another biting of a Dog.

WE caused also another Dog to be bitten under the Belly by another

and

angred Viper. He howled presently, but that lasted not long. The place bitten swelled much, and was very livid, and the tumor and lividness reached over all the natural parts. This Dog drank often, but would eat nothing, and was alwayes in this condition without growing worse. Two dayes after, to be more certain of the thing, we caused him to be bitten again, and that twice, near the same place, where he had been bitten at first. He again howled much, and the swelling increas'd, and extended it self over the whole belly, as well as the black and blew colour; but it went no further; for the dog often licked his wounds, and drank store of water, and at last fell to eat, so that without any other remedy, but his tongue, all the swelling and blew colour vanish't in five or six daies. And the dog was in the same condition, he had been in before he was wounded.

Another Dog bitten in the Tongue.

THIS Dog gave us some trouble; for he defended himself a great while, be-

before he would let out his Tongue; but yet at last he received therein a deep bite by an enraged Viper. At first he howled extremely, so as to be heard afar off, and so continued, tossing and tormenting himself for half an hour together, and then dyed. We opened him also, and although the Heart, Liver, Lungs, and Spleen were in a very good condition, his tongue was exceedingly livid; his mesentery cover'd all over with black spots, some of which were blacker then lentils, under which there was coagulated blood; the Stomach and Guts were also blacker than those of all the others. The bloud very black, and beginning to coagulate in the heart, and in the *vena cava*, being also of the consistence of bloud curdled and corrupted.

This last Experiment gave us great satisfaction, informing us fully of the effects of the venomous biting of a Viper, and shewing us, that the poysion goes not directly to the noble parts, seeing we never observ'd any alteration therein, but that 'tis chiefly the bloud it works upon, since it corrupts the substance thereof, coagulateth it, or separateth its parts, disturbs its

its circulation ; and at the same time hind-
ders the communication of the Spirit through the whole body , depriving the noble parts of them, as well as of the pure bloud, which was wont to bedew them, and destroying them indirectly, by causing this privation of Spirits and of the good liquor , whence depends their subsistence.

We also found thereby that the progress of the venom of a Vipers biting principally depends from the place bitten, and from the bigness of the veins or arteries, which the teeth hath lighted on. For, the tongue of the Dog being full of veins and arteries, 'tis no wonder , if the Venom, meeting with them, and finding in them a large way, very short and very free to triumph over the bitten animal, did soon produce its effects; and caused death much more speedily, than that, which met only with small, slender and winding branches, by which its way was straighter, more about, and longer ; though it failed not to do execution at last ; which it would have done sooner, if the passage had been freer.

We may judge by the effects of the venom

nom of the Vipers biting in those dogs, and especially in the last, that the vomiting, and the extreme pains about the Navil, which befell the Gentleman, above discoursed of, proceeded partly from the bloud which was coagulated or disposed to coagulation in its course, and which could not freely circulate; and partly from this, that the spirits, which accompany the bloud in the circulation, finding obstacles in their passage, endeavoured to make way for themselves, and to that end, doing violence to the lateral parts in their way, caused in those places the extreme pains, which the Patient felt there; which might also be augmented by the bloud, that probably was coagulated out of the great vessels, and might be dispersed in the form of spots in the Mesentery, or elsewhere, just as in the body of the Dog.

We may conclude also, that the cold sweats, the convulsions and the faintings, wherewith the Patient was molested, came from nothing else, but the defect of the ordinary commerce of the spirits with the noble parts, and from the ^{want of} goodness and purity of the bloud destinatied to bedew them.

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Concerning the success of the remedies employed to cure the said Gentleman, we shall declare our thoughts thereof in the sequel of our Experiments, after we shall have given proofs sufficient to support them.

As to the Dogs, that were cured by licking the wound, I think that that was a good means to recall and draw back the venom; and I am much of their opinion, who believe, that if the person bitten, or some friend for him, should for a good while and strongly suck the wound, it would be cur'd, provided that the teeth of the Viper have not lighted upon some great vessel, whereby the progress of the venom may prevail over the force of sucking. I am also persuaded, that these sucked and recall'd Spirits are incapable to annoy him who sucks them, partly because they have been weakn'd by the action they have been upon, partly because they are then destitute of the instruments proper to convey and second their action, to wit, the teeth of the Viper.

CHAP.

CHAPT. III.

EXPERIMENTS

Of the Biting of Vipers, made
upon Pigeons and Pullets.

THE Experiments made upon these Animals have likewise been very useful to us, to know the effects of the Biting of Vipers, which have been very like in both.

We caused a *Pigeon* and a *Pullet* to be bitten by a vexed Viper, almost at the same time, in the most fleshy part, namely in that under the breast. We soon after observed in both a very thick and extraordinary beating of the heart, which went on still increasing, and in such a manner, that both *Pigeon* and *Pullet* were dead in less then half an hour. We soon opened them, and found in both of them a little bloud coagulated in the heart and the *vena cava*, and all the rest of the bloud blackish, disposed to curdle, and as 'twere turn'd and

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corrupt; but the Heart, and Liver, and all the inward and outward parts of a very good colour, and in a very good condition, save that a little lividness appear'd upon the place bitten.

We have frequently observ'd the same thing in many Pullets and Pigeons: But it will not be amiss, here to relate the different success in two Pigeons, we caused to be bitten equally and in the same place by an angered Viper. One of them we made to swallow the weight of about half a crown of Theriack, a moment before it was bitten, giving nothing to the other. The former being bitten, went to and fro in the room, so as not to shew any sign of illness, but the latter was dead in less than a quarter of an hour. We afterwards caused the former to be bitten again in the leg; and then it grew sick by little and little, and dyed half an hour after. We found the place of the first pricking much more livid, then that of the Pigeon, which dyed in a quarter of an hour; and even more then the place of the leg, which was bitten afterward. We judged, that the vexed spirits unable to penetrate into the body, defended by the Theriaque, had wrought

wrought upon the outward part, and round about the place bitten, where they had coagulated the bloud, and caused the lividness; whereas the like spirits, having met with no resistance in the other Pigeon, had gained and wrought upon the inner parts, having left and as 'twere despised the place, at which they were entred. We also wondred not, that the Theriaque, which had vigorously repulsed the Spirits introduc'd by the first bite, could not resist the latter but for half an hour, and that at last it was forced to yield, in regard that the number of the enemies was great, and being weakn'd by the conflict, it had but now endured, had not force enough to bear up against the new assault of the latter.

We did also prick several times, and pretty deep, dogs, pigeons and pullets, with the long teeth of Vipers, some pull'd out of the throat of dead ones, others out of such as were alive. There was also one of the company, who handling a dead vipers head, had a mind to prick his finger, and actually did so, with one of the great teeth, so that the bloud issued. I also my self thrust into my hand one of them, and so deep, that a piece of it remain'd more

than half an hour in my flesh; but in all this we found not the least appearance of venom, nor any ill, but such as might be caused by the pricking of a Pin, or some such thing.

We also deplum'd a Pigeon at the most fleshy place, and holding with both our hands the jawes of a Viper open, and making her raise her great teeth, we pressed both the jawes at once against that fleshy part, and caused the teeth deeply to enter into it, and order'd the matter so, that the yellow liquor of the Gums had time enough to pass into the wounds, which the teeth had made. We at the same time saw, that the bloud issued out of the wounds, and mingled it self with the yellow juyce, which remained there. We had then ready a little stone, come from *Portugal*, which those of that Country call the *Snake-Stone*, being pretty black, shining, roundish, and flat, about the bigness of a French piece of five *sols*, but three times thicker; which we presently applyed to the place bitten, which was cover'd with bloud, and with the yellow liquor mingled therewith. The stone immediately was fastned to the wound, and we perceived nothing, extra-

extraordinary in the Pigeon. We might have believed, that this safety of the Pigeon was due to the vertue of this Stone, which they would assure us was infallible against the bitings of Vipers and all kinds of Serpents, if we had not some dayes before tryed the like Stone upon a Pigeon, bitten in the same place by an angry Viper, and if that wound had not been follow'd by the death of that Pigeon, a quarter of an hour after. We thought, this very well deserved another experiment; and having still the same Stone by us, which seem'd to have saved the former pigeon, and such another, which the Lord Ambassadour of *Spain* had trusted his Physitian with, we by one and the same enraged Viper caused to be bitten two Pigeons of equal bigness and fleshiness, each in the same place, well freed from its feathers. The bloud was seen upon both wounds; but there appear'd but little of the yellow liquor. We soon applyed both the Stones, one to each Pigeon; they presently stuck fast to the places pricked; but we saw immediately in both a very high and thick beating of the heart, which was follow'd by the death of both Pigeons, which hap-

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ned at one and the same time, in less than a quarter of an hour.

We had also a mind to know, whether the Venom, that had so much force upon the bloud, were also able to make some ill impression upon the noble or solid parts of the bitten animals, which parts appear'd to us very fair and very well conditioned. We gave also a Pigeon, dead of a Vipers biting, to be eaten by a Cat that was very lean, which fed very greedily upon it; and the same did afterwards eat many more, and Pullets also; upon which she grew very fat, so far was she from finding any inconvenience thereby.

Moreover we had a desire to learn, whether one and the same Viper was able to kill by its biting divers animals wounded, one presently after another; and whether the Venom was exhaustible, so that the animals, bitten last, might be free from its mischievousness. To know the truth hereof, we caused to be bitten five Pigeons one after another, by the same Viper, which we angered every time she was to bite: All these Pigeons soon dyed; and we particularly observed, that the last bitten dyed first of all. And as to the Bloud,

and

and all the inward and outward parts, they were in a manner alike with those of the Pigeon, that was bitten first.

The various Experiments, we have been relating, do insensibly oblige us to deliver our thoughts concerning the Venom of Vipers, and its operation. We think this to be a proper place to declare ourselves here, and afterwards to employ the rest of our main experiments for the defence of what we shall have advanced upon this Subject.

CHAP. IV.

Of the Venom of a Vipers Biting, and its Operation.

THE Antiens, prevented by the opinion, that there were very few parts in a Viper, that were exempt of poyson, have but very slightly examin'd them. And as they esteemed that the Choller of the Viper did much con-

tribute to the Venom, believing, that the seat thereof was in the Gall, they there also settled that of the poyson, and imagined, that the taste of the Gall, very sharp and very bitter, was an argument of its malignity, and that the veins and arteries, which pass near the Gall, and may be followed as far as into the jawes, and appear the same through the whole body, above and below the Gall, were the pipes, which Nature had purposely form'd to carry the juyce of the Gall into the Gums, and that it was that liquor, which caused all the mortal Symptoms, and death it self.

But they have not considered, *that* this Choler of the Viper resideth not in the Gall; *that* the Galls of innumerable other Animals have a taste very approaching to that of a Viper, and yet are not venomous; *that* the veins and arteries, which pass near the Gall, and seem to part thence and extend unto the Gumms, and all the parts of the Body, are vessels designed, onely to convey the blood, which have not their origin in the Gall, and which cannot carry a juyce, which they could not receive: *that* there is not any taste

taste of Gall in all those imagined Vessels, no more than there is in the liquor of the Gums, nor in all the rest of the Body above the Gall: and *that* in the whole Bladder of Gall there is but one vessel, that is any thing considerable, though it be very slender, which issuing, as we have said, from the internal side of the upper part of the Gall, descends (so far is it from ascending) and discharges it self into the first intestine, according to the description we have made of it, and conformably to the Figure, that may be seen in the *Cut*.

But not to stay upon principles so slightly establish't, and ill maintain'd, forasmuch as we have on our side a great number of Experiments, upon which we are grounded; We say, That the *Gall* of a Viper is not at all Venomous, but *that* on the contrary it contains a Virtue, that is Balsamick and cleansing, and very proper for many good uses; *that* there is no Vessel, which carries its juyce to the Vesicles, that are about the great teeth; *that* the yellow liquor, therein contain'd, is in all things very different from that of the Gall, excepting that they are both equally free from Venom; *that* that yellow liquor is gather'd,

ther'd, and form'd by the *Salival Glands*, above described; *that* it is carried into those Vesicles or Baggs by the *Lymphatick vessels* which part from those Glands; *that* this juyce is nothing but a pure and plain *Saliva*, of which we have *already observ'd* the use; and *that* this juyce contributes nothing to the venomousness of the Biting; since, being tasted and swallowed (as we have often experimented) it does no hurt neither to man nor beast; and since also, being put upon open wounds, and upon incisions made in the flesh, the same being rubb'd therewith, and mingled with the bloud, it annoyes nothing at all: notwithstanding the judgment of a person very intelligent, and particularly in this subject of Vipers, wo assures to have made a great number of Experiments; which being contrary to ours, the great opinion we have of the abilities and the sincertainty of that famous man, hath obliged us to employ the more care and exactness, and to confirm ourselves, by a very great number of Experiments, which have alwayes been found alike, in the truth, we here assert, and of which we shall make evident and irrefragable proof.

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We say further, that there is no other venom in all the other parts of the Body ; and more, that there is none even in the great teeth, if the Viper be not alive, and the biting not accompanied with vexed and *enraged Spirits*. The hurt, which the teeth doth, when the Viper biteth, consists chiefly in that it opens a door to the *angred Spirits*, without which irritation the Biting of the teeth is not mortal, and ought to be no further consider'd then for the deep and direct wound, which a tooth, so sharp, so long, and so slender, of any other animal whatsoever, might make. In which circumstances, the great number of Experiments, by us made, hath render'd us knowing; in regard that we have observed a quite manifest difference in the Biting of a Viper *angred*, from that of a Viper, which was made to bite by holding its jaws, and by pressing its great teeth into the body of some animal: because this forc'd action serves rather to make the Viper retain its spirits, then to let them out; for which the freedom of the animal is necessary, the spirits not being able to part, but the imagination and the Choler of the Viper must

must immediately precede and thrust them out. For this way of biting, by holding the jaws, and thrusting the teeth into some animal, although it emit more of the yellow liquor upon the part bitten, than the biting made by an angered Viper, left to it self, is not followed by any sinister accident, and is healed like a simple wound, whereas the other is attended with death, in case we want means of preventing it.

The effect therefore of the venom being altogether of a spirituous nature, and not working but according as the spirits are more or less irritated and push't on, and according as they finde more or less free passage, we have reason to impute it to the exasperated Spirits, having found no footstep of it, neither real, nor apparent in all the visible parts. But the better to maintain this our assertion, we shall here give you our thoughts concerning the action of the enraged Spirits.

These Spirits then, push't on by the choler, which the Viper had conceived, finding the apertures, made by the Teeth, follow their inclination, and as it is their property, to advance and penetrate, they at the first seek out all wayes for it, and they

they advance more or less, according to the facility or difficulty, they meet with. Thence it is, that the Biting is much more dangerous, when the teeth light upon the greater vessels, than when they only light upon Flesh, or the little branches of the veins and Arteries. So that the vexed Spirits of a Viper, meeting with the bloud and Spirits contain'd in the vessels of the bitten animal, push and press them to make way for themselves, and embarrassing the particles that compose the bloud, cause there a coagulation or confusion, which disturbs the ordinary Circulation, and by this means hinders the communication of the Spirits, to the principal parts, from which depends their subsistence and life. And by reason of this privation they must succumbe, either for having been attack't in their fort by these vexed Spirits and infected by them, or rather because these spirits of the Viper have made themselves masters of the *avenues*, and obstructed the passages, by which the blood and the spirits were communicated to them.

We conclude therefore, that the imagination of the Viper being irritated by the

the *idea* of revenge which she had fram'd to her self, gives a certain motion to the Spirits which cannot be expressed, and pushes them violently, through the nerves and their fibres, towards the cavity of the teeth, as into a funnel; and that from thence they are convey'd into the blood of the animal, by the opening, which they have made, there to produce all those effects, of which we end eavour to give a reason. Others, more able than we, may perhaps carry their reasoning farther.

For the rest, some have thought, that those enraged Spirits have in them a secret acidity, capable to coagulate the bloud, and to hinder the Circulation, whence the mortall accidents proceed. But since that this acidity may have been produced in the mass of the Blood by its own parts, which come to be dissolved and severed, when they are tainted by the venom, and since corruption slides into it, as into milk, which sowreth and corrupteth of it self, without mixing any acid thing therewith; it is not necessary to search for a coagulating Acid in the Spirits of the Viper, which cannot be perceived by the taste to know the truth of its existence therein; and

and that the less, because *that Acid* may be naturally formed in the Bloud of the animal bitten, without looking for it in the Viper, as if it had come from thence.

How-ever this be, we must agree herein, that this irritation in the phansy or in the spirits of the Viper is the main cause of the activity and piercingness of its venom, and that without it the biting would not produce such surprising effects, as those are, of which we have related so many Examples. Nor is a viper the onely animal, whose biting is mortal: Dogs, Wolves, and Men themselves prove that; and not to go from our Subject, the biting of Serpents, of which the Viper is a *species*, is more or less malign, according to the nature of their spirits, and especially according as they are angred and exasperated.

It seems, that *Cleopatra* was well instructed in this matter, when she, intending to kill herself, commanded to be brought her two *Aspes* in a fruit-basket, and pricked them with a golden needle, which she pulled out of her hair-dress, and made her self be bitten immediately by one of those *Aspes* in the right arm, and by the other,

in her left breast; knowing (as a famous Author saith) that their natural fierceness and cruelty was not sufficient to execute well what she desired, and that it was needful, this pricking should serve to provoke the spirits to bite to purpose, and to render the wound mortal; if at least it be with *their* biting, as it is with that of our Vipers, who also have this particular quality, that not onely they are soon angered, but that in the very moment of the irritation they bite with a strange swiftness; which speaketh much the subtlety and impetuousness of their spirits, whence depends their strength and activity. We observe also, that in distilling Vipers bodies, we thence draw very subtile and very penetrating parts, and in much greater quantity, in proportion, than from any other animal.

In the mean time, the obstacle, which these irritated spirits of the Viper give to the communication of the spirits of the animal bitten, nor the coagulation, or confusion, which they cause to the bloud, are not of that force, that specifique remedies should not master them, and restore the animal unto that Condition, where-

wherein it was before it was wounded. Which is that, we shall prove in the sequel by divers Experiments ; where we hope to shew in what manner the remedies do overcome the powerful action of those enraged Spirits.

CHAP. V.

EXPERIMENTS

Of the yellow juyce, contain'd
in the Vesicles of the great
teeth, made upon divers
Animals.

IN the design, we had, well to try all things, we pursued our Experiments, and to be well assured of the quality of that yellow liquor, which hath been believed so dangerous, we caused to be bitten, by six angred Vipers, se-

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parately

parately and several times by each of them, a slice of bread, and so much, that it had well exhausted and retain'd all the yellow liquor, contained in the Gums of these six Vipers: At the same time we gave this slice of bread to a fasting Dog, to eat, who was no more inconvenienced thereby, than if he had eaten a piece of dry bread, that had imbibed nothing of this juyce.

We have also often made divers Pullets and Pigeons to swallow pieces of bread dipped in the same liquor; and we can assur, that none of these animals had any mischief thereupon.

I my self had the curiosity to taste of this juyce, which I have divers times done in the presence of many persons, without washing my mouth before or after. And several Physicians also have tasted of it themselves, both to know the tast, and to be assur'd of the harmlessness there-of; and 'tis certain, that they were no more incommoded thereby than myself.

And because it hath been believed, that this juyce, being thus tasted and swallow'd by Men or other Animals, that had no wound

wound nor Ulcer in their mouths, nor in their stomachs, was indeed harmless; but that it was quite another thing, when it did accompany a Biting, and entred into the openings made by the teeth and that the same being put upon an Ulcer, a wound, or a simple excoriation made on the skin, was mortal, and failed not to produce its effect, three or four hours after it had been put upon the wound; and that as well upon Men, as all other sorts of Animals, without exception; we resolved also to make many Experiments upon this account.

I can therefore say, in the first place, that I have tasted of it my self, at such times, when my mouth was excoriated, upon which I observed, that even my spittle was a little ting'd with bloud, without having perceived any acrimony, or extraordinary heat. We also made a Tryal upon a Pigeon, which we wounded under the wing, and in the leg in the same moment of time; and we let into each wound some of this yellow liquor, which we just afore had drawn from the gums of two enraged Vipers; then we re-joyned the skin, well to inclose the said liquor, and we bound both wounds over with a

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band, that nothing might run out. We can assure, that the Pigeon felt not any inconveniency from it, and that we even found upon the wound, made on the leg, a coagulated drop of the juyce, round, and of the same colour, as we had put it there, and the bloud of the place dried, and that, soon after, both wounds were dried up, and heal'd of themselves.

We also made the like Experiment upon a Cat, which we purposely wounded in the leg, but he received no harm at all by it. We have also often experimented it upon Pulletts, and other Pigeons, but alwayes with the like success, and without any offence to the Animals.

The same tryal hath been thrice made at three several times, and even twice in one day, upon a dog, whom we had wounded on purpose towards the bottom of the Ear, where he could not lick his wound; and no mischief at all followed upon it.

We cannot but adde here an Experiment of the mortal effect of the enraged Spirits, without any intervention of the yellow liquor. We made a Viper several times to bite upon a slice of bread; by pressing every time its jaws against the bread,

and

and we did this so often, that not only that
juyc was altogether exhausted, but that
the bloud began to come out of the gums.
At the same time we vexed the Viper,
and made it bite a Pigeon in the most fleshy
part; and we observ'd, that indeed the
effects of the venom of the biting were
not so quick, the Pigeon not dying but an
hour and an half after it had been bitten;
but then we found also, that the teeth of
the Viper were in a manner cover'd with the
crums of the bread, from the force of its
having bitten at it, and that that had hin-
dred them from making a deep entrance,
and that having half stop'd up the pores of
the tooth, a good part of the angred Spirits
could not come forth; so that the death
of the Pigeon could not follow so fast,
though yet it hapned without any mixture
of the juyce which had been altogether
emptied.

CHAPT. VI.

EXPERIMENTS

*Of the Gall, Eggs, Intestins,
Head, and Bloud of Vi-
pers, made upon divers Ani-
mals.*

WE have made several Dogs and Cats to swallow the Galls of Vipers, sometimes whole, sometimes burst, and dissolv'd in some liquor, and sometimes six, sometimes ten, sometimes a dozen at a time; but they never found themselves ill after it, no more than the Pigeons and Pullets that had swallowed some of it, and which we had also wounded, and afterwards rubbed with the Gall of a Viper: for this Gall served them for a Balsom, the wounds being the sooner cured thereby; so that we can justly declare the gall

gall to be free from all venom, as well as the yellow liquor; and even inculcate here what we have already said, that the galls of Vipers have particular vertues in them.

We can say the same of the *Matrix* and Eggs of a Viper, and of all the Intestins, of which we often have made good quantities to be swallowed by Doggs and Cats, some of which have eaten thereof with greediness, when they could light upon't; and none ever hath felt any trouble after it. On the contrary, we have tryed, that having caused to be bitten, at the thickest place of the Ear, by a sufficiently vexed Viper, a young Cat, very lean, that had but just before eaten the Eggs, the *Matrix*, and all the guts of a Viper; the biting had almost no effect, and there appeared nothing but a very little swelling, and a very inconsiderable lividness in the place bitten.

We have further made many Dogs and Pigeons swallow the Heads of Vipers, newly cut off, and yet living, having only cut with Sizers the point of their great teeth, least in passing down they should bite the throat, or the inward parts of the animals, that were to devour them; but

we have not observ'd any thing after it, that was extraordinary, in all those creatures.

We had also a desire to find, Whether a Viper, being eaten by an Animal, which it had bitten before, would be cur'd of that biting. We therefore caused to be slightly broyled the head of a Viper, which had on it a part of its neck, newly sever'd from the body; and we made a Dog to be thrice bitten at the Ear by a well enraged Viper, in such a manner that the blood came out at the three places pricked. We soon cast before him the head and neck, broyled, and yet hot. The dog, that was hungry, and felt not so soon the effects of the bitings, immediately seized on the head, bruised it between his teeth, and swallowed it down: after which we stayed a pretty while to see, whether the three bitings would prevail over the devoured head and neck; but the Dog was free, except some blewness and a little tumor, he had at the places bitten, but which little by little vanish't in three or four dayes.

We made also a dog to be bitten three times in the same place, and without broiling the head of the same Viper that had bit

bit him, we cast it to him, hoping that he would eat it, because he had not eaten any thing for many hours before; but the dog would not touch it. Upon that we bruised and stamp'd that head in a mortar, and so cramm'd it down the dogs throat; rubbing also the bitten places with the bloud of the same Viper: which done, we expected the success; which was, that this head, raw and bruised, and if you will, assisted by the blood of the Viper, being applyed to the part bitten, had produced the same effects with the former, which had been so slightly broyl'd; in regard that this dog was free, excepting those inconveniences the former suffer'd, and was, after that as sound, as if he had never been bitten.

If these two Experiments had been made, before that Gentleman, above discours'd of, was bitten by the Viper, we should have been in much less anxiety for his preservation. But it was enough, that we were able to secure him from the dangerous effects of the biting, by wayes grounded upon reason, and by remedies, that were more proper for such persons, as could not well resolve to eat the bare flesh of Vipers.

CHAP.

CHAPT. VII.

Several other Curious Experiments made upon Vipers.

W^Hereas we gave but little credit to what divers Authors have assured to be true, namely, that the Head of a Viper bruised and applyed to the biting of it would heal the same; we made a Pigeon to be bitten in the most fleshy part of its body, well freed of its feathers, and we cut, bruised, and applyed to the place bitten, the head of the same Viper, that had wounded the Pigeon, and took care to have it held upon it with a hand. We also cut the head of a living Viper, and had it slightly broyl'd, then bruis'd and laid hot to the wound of another Pigeon, which had been newly bitten in the same place, to find, whether by the heat of the broy-

broyling, the parts of the head being more open'd, and the spirits more set at liberty, they would work better; but the success was not more beneficial for one Pigeon, than the other; for they both dyed half a quarter of an hour after they had been bitten; and their bodies being open'd, we found in them, what we did in others, kill'd by Vipers, namely a blackish blood, in part coagulated, and half corrupted, in the heart and the great vessels; but we took notice, that there was less black & blew about the place bitten; which was perhaps all the effect, that these bruised heads had produced, which had not been able to carry their virtue any farther.

It is not so, (to say that on the by) with the pricking of a *Scorpion*, which being bruised on the part stung, serves for an Antidote, and cureth: for which this reason may be alledged, that the venom of a Scorpion, not working so briskly, and not piercing with so much quickness unto the inward parts; the Spirits, that issue from the bruised Scorpion, have leisure to make way for themselves, and to go and find out the venom, to joyn with it, and to make it come forth; whereas the ve-

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nom of the Viper goes immediately to taint the mass of the blood, and the parts which it bedeweth; as was apparent in our Gentleman, who had no pains nor swelling in his arm, but after all the other accidents; contrary to the operation of the Scorpions Venom, which, before it passeth further, asteth upon the part prick'd by benumming, cold, and tension, or by inflammation, and very great pains; as those Authors, that have written thereof, and the persons, that have been prick'd by them, doe assure.

We have found very true, what Signor *Redi* hath said of the effects of the Essence of *Tobacco* upon Vipers; That, running their skin through with a thred dipp'd in that essence, and leaving the thred in the skin, the Viper dies in less than a quarter of an hour, and becomes as hard as brass, but soon after supple and plyant. We have also tryed, that a little piece of *Tobacco* in the roll, held in the throat of a Viper, and the smoak of *Tobacco* blown into its throat produce the like effect, but a little more slowly; and that both do cause convulsions, and extraordinary contractions in a viper, which are attended

ed with death ; and that, when all the other parts of the body are deprived of motion, the heart yet beats about half an hour after ; and that Tobacco, or its essence, kills Snakes as well as Vipers. I know not, whether this will do with other animals, since, having run a thred dipt in the essence of Tobacco, into the skin of the under-belly of a Dog, he immediately howled very much, and continued so to do for half a quarter of an hour, running round, then lying down, and then rising again, and in the mean time purging above and below, and voyding excrements more liquid then ordinarily. He would eat nothing, and onely drunk now and then a little, after which he vomited ; but this was all the trouble he had, which insensibly went away, and soon after, without any other accident.

We have vexed a viper, and made it to bite another viper, which on purpose we held within the reach of its teeth. But although she open'd her throat, and put her self into a posture of biting, yet she refrained, and sunk not her teeth deep into the body of the other ; which moved us to thrust them our selves by pressing her jaws ; but

but the bitten viper received no inconvenience from it. Yet we have observed, that a viper which was made to swallow some of the essence of Tobacco, and which we yet held by the neck with pincers, did bite herself; but as the essence alone failed not to kill her, so there was no reason to impute her death to this kind of biting, which was probably an effect of the convulsive motions caused by the essence of Tobacco.

We also pierced twice, in the day-light, with the point of a pen-knife, the head of a live viper in the midst of the Brain, from the top to the botom; one thrust long-wayes, the other cross-wayes, and in such a manner, that the blood run out both above and below; but notwithstanding, the viper, being let loose, crept about as before, and as if she had not been wounded; but she still lost bloud by the wounds, and at last dyed at the end of an hour, but her heart did still beat, and continue to do so two hours after. Which Experiment sufficiently argues the extraordinary vivacity of the Spirits of the viper.

We have also put into a glass-vessel, a living

living viper, together with three live *Scorpions*, and there left them together four dayes ; but found them in the same condition, in which they were, when we put them in, though there be Authors that assure, that these Animals kill one another, being shut up together in one and the same vessel. Mean time a viper will kill Scorpions, as well as Lizards, and other animals to devour them and feed upon them, but that she doth only, when she is at liberty, and not when imprison'd ; for then she ceaseth to take food.

We have likewise found the contrary to what Authors have affirm'd of the *Waspe's* attaching a Viper, and that the former would fix its sting into the head of the latter, and quitted her not, till she were dead.

Divers Authors have assur'd, that all the remedies, which are reputed Alexiterial, or Preservatives against poison, did kill Vipers, by their vertue contrary and opposite to their venom. To be certain hereof, we forced a Viper to swallow half a drachm of *Tberiaque*, dissolved in *Carduus Benedictus*-water ; and having laid her aside, we perceived not any change in her,

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except that the surface of her skin appear'd for a while a little moist ; but she grew more vivid upon it, and more ready to bite than before.

We had also a minde to know the effect of *Spirit of Wine* upon a Viper. We therefore made one swallow about a drachme of it ; which thereupon was presently stun'd, and then fell into strange agitations ; but seeing that that ceased little by little, we gave her another dose of the same quantity, which not onely caus'd in her the like agitation, but afterwards made her almost un-moved, and so inebriated her that she seem'd to be half dead. She remain'd about three hours in this condition, but at length she began to stir again, and was like the former, more brisk, and more disposed to bite than before. We put also a living Viper into a bottle almost full of *Spirit of wine*, and we saw, that she turned to and fro therein, now swimming on the top, then in the middle, and by and by at the bottom of the bottle, and that she resisted a good hour, before she was choaked therein.

We caused likewise a Viper to swallow some sugar, part of which was in powder, and

and the other part dissolv'd in water. She kept the whole for a while with her, but afterwards vomited it up ; and having laid her aside, to see, what would become of her, we found her dead four and twenty hours after.

We have often spit into the throats of many Vipers, even when we were fasting ; but they soon after cast up our spittle, and had not any hurt thereby ; though there be Authours affirming that Vipers become tabid or consumptive thereby ; which yet may very well happen, not from thence, but rather from the abstinence and sadness, after a long imprisonment.

Many Authors have mentioned, that Vipers have a great Antipathy to *Ash*-wood, and that, if a live Viper were put within a round, made, one half, of the leaves of *Ash* ; and the other half, of kindled coales, the Viper would rather expose herself to be burnt, then to come near the *Ash*-leaves. But having made a whole round of such leaves, which had about three foot in diameter, we put a Viper in the midst, which presently hid herself under those leaves.

Whilst I had live Vipers in my house,

several Women with child came to me, some designedly to see them, others without having any such thought, and even being surpris'd at, and abhoring the sight of them; but none of them having been inconvenienced by it; so far were they from miscarrying thereupon, as certain Authors would beare us in hand they would do. Not that such a thing may not chance to happen to some woman or other extraordinary fearful, and of a temper so delicate, that a much less occasion might produce such an effect; but that ought not to pass for a general rule.

We have often pressed some Vipers, both Males and Females, at the place, where be the *Parastates*, or the Bladders containing the seed, namely under the tail, and near the openings, which serve for generation; and have so much and so long press'd them, that a white liquor came forth; but we never perceived there any piercing or ill-scented smell, no more than we did in opening those *Parastates* with a lance, though we held our nose close to it: which is also directly contrary to what some Authors have assured thereof.

CHAPT. VIII.

GENERAL REFLEXIONS

Upon all we have experimented.

THE great care and attention used by us in the Experiments, we have hitherto described, and in those, we have thought fit to suppress, hath made us to profit of all the occasions, that presented themselves ; and we have taken pleasure to observe all the effects, that have appeared to us, and carefully examined them, and inquired into their causes afterwards, that we might make our reflexions thereon.

The Biting of the Viper, which hapned to the Gentleman Stranger, began to furnish us with much matter ; and at that time we knew the Venom by its effects, which seem'd to proceed from a very slight cause, it being nothing but a little pricking, and onely the cut of a tooth, which was not any thing deep, and the ill of

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which did not seem to us increased by any of the yellow liquor of the Gums, the innocence of which was not yet fully known to us. In the mean time the mortal Accidents came on in great number, whilst continued vomitings hinder'd the effect of the remedies, which could not be kept in the Stomach, to communicate from thence some of their vertue to the parts affected. It was well enough known, that there w. s something very subtile, very quick, and very powerful in this Venom ; and it was also presumed, that that resided in the Spirits ; but the nature of it, or by what means, or how, or on what parts it acted, was not known so well.

Yet we must avow, that on an occasion so pressing, so dangerous, and so extraordinary, we could not take our measures better than by having recourse to the Volatile Salt of Vipers. The cause being subtile and spirituous, there was required a remedy of the like nature, that might be able to make haste to finde it out, to joyn with it, and to draw it to the extremities of the body, and to make it come forth by the wayes, it had opened for it. But then, the continual vomiting demanded the

the aid of such a remedy, that could work in a moment, or execute at least by several takings, what it was not able to do at the first. The happy success, which attended the use of this Volatile salt of Vipers, acquainted us with the sufficiency thereof, and showed us the mastery it had over the malignity of those Spirits. It also begot in us a desire to know aright, in what manner it produced such good effects, and to be enabled so to discourse of it, as that others might have no reason to reject our sentiments.

We esteem therefore, *that* this Salt, by its subtile, volatile and piercing quality, is very proper to dissolve the coagulations of the Bloud, and to sever the parts, which therein were congeal'd or fix'd, (if we may so speak) and caus'd the disorder and confusion of its motion; *that* it performed this in the Blood of the said Gentleman, which it restor'd to its former condition, and so gave again to the parts the free communication of the Spirits, which they had lost. We believe also, that this Volatile Salt, by the facility it had to hook and fasten it self unto those vexed Spirits, as being of the like nature,

did easily joyn with them, and drove them to the extremities of the body, drawing them forth through the pores of the skin, and issuing out with them by the way, it had open'd for them.

The Ligatures made about the place bitten, the Scarifications, and the approach of the well heated iron-spatuls to the wound, were to serve to stay the impetuousness of those irritated Spirits, and to give them an out-let at these openings, rather than that they should go farther: And the exhibition of the Theriaque, the Viper-powder, and the like, was to conduce to drive them back, as it might have done, if these remedies had stay'd in the Stomach. As also the *Epithemes* of Theriaque upon the Heart and Stomach might have serv'd much, if the action of the enrag'd spirits had been more slow, and if at the time of their application those spirits had not been too farre advanced.

But the Use of this Volatile Salt was to carry the Bell, as it did, from all the other remedies; and those, that were employ'd afterwards and in the intervals of its exhibition, were nothing, if we may so

so speak, but Souldiers assisting their Captain; such as the Confection of *Alkermes* and of *Hyacinthe*, which were very proper to fortify the noble parts; as also were the Syrup of *Limons*, and the Decoction of *Scorzonera*, and the shavings of *Ivory*.

The Slices of *Citron*, which might seem to some by their acidity capable to augment the coagulation of the blood, were not given till after the Volatile Salt had used its force to dissipate it; and they served to recover the Stomach, debilitated by continual vomiting, and by their acidness to restore the lost appetite, and to help the concoction of the aliments, and their distribution into the parts, that had need of them. Besides that *Citrons* have a specifique vertue against the poyson of *Vipers*, if we will believe those Authors, that have written of it; and is a great friend to the Heart and the other noble parts.

The Anointing with the Oyle of *Scorpions* of *Matthiolus*, and with the water of the *Queen of Hungary*, made upon the swell'd parts, and the application of *Alexiterial fomentations*, should in all appearance have serv'd much; but the sequele

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shew'd, that there was nothing but that Volatile Salt, which could make those angry Spirits surrender, and so was to take the honour of all.

The Experiments, which we afterwards made upon a great number of differing Animals, have given us a much greater knowledg of the effects of Vipers-poyson, of the parts on which it works, and of those that seem to be exempt from it, though at last they do succumbe: We have set down the most considerable of them, making some reflexions on the biting of several Doggs, done by Vipers; but there remain'd still for us to discourse, Why and How the parts of Vipers, being eaten, can stop and overcome the Venom of their biting.

We say therefore, that all the parts of a Viper abound chiefly in Volatile Salt, which in distillation is found partly alone, partly in the form of a Spirit, which properly is nothing but a Salt dissolved in some portion of Phlegme; and partly in the form of an Oyle, which also is but a Salt mix't among the unctuous part of a Viper. We say also, that in the digestion, made in the Stomach, of the parts of a Vipers body

body, that have been swallowed down; this same Volatile Salt, which they contain, is separated, and afterwards distributed to all the parts that need them; especially if of these parts there have been swallow'd enow, to furnish that quantity, which is necessary, of this Salt; and so we need not doubt, but that this Salt will produce an effect like that of the Volatile Salt, which was given to our Gentleman bitten; Unless it should be said, that this same Volatile Salt of those parts of a Vipers body, which have been swallowed, being of the same nature with the irritated Spirits, attracts them to it self, and by this union changes their maligne quality, and so tames them, that they have no power over the bitten Animal; which, in my opinion, is hard enough to conceive, and perhaps established upon unsolid foundations.

We hope, that among the many Experiments, those of the Five Pigeons, bitten one after another, by one and the same Viper exasperated, and of which the last bitten dyed first of all, when the Viper was most vexed, and most exhausted of its yellow liquors and that of the Pigeon bitten by a Vi-

Viper, which we had caused to bite several times into bread before, and that even till bloud came forth, to the end that the Juyce might be well emptied of it, and which notwithstanding was followed by the death of the Pigeon; These Experiments, I say, will prove on one hand, that the yellow liquor contributes nothing to the poyson; and on the other, that these incensed Spirits, assisted by the openings which the great Teeth had prepared for them, are the sole and true cause thereof.

The wound, made by a Viper not vexed, whose jaws were held in, and whose teeth were at the same time thrust into the body of a Pigeon, which also was accompanied with store of the yellow juyce, and yet not attended with any ill accident; as also the pricking, made by the great teeth, pulled out of a live Viper, or by such, as stuck yet in the head of a dead Viper, and did no hurt at all, do sufficiently confirm this truth, viz. that the cause of the Venom is to be imputed to the Spirits enraged, and not to any other thing or parts in the Vipers body.

I have not undertaken to reason upon
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all the Experiments, we have made, as I have done upon the Bitings, both because that is beyond the Sphere of a man of my profession, and because I designed onely to confine my self particularly to the wounds and to the Remedies able to heal them.

For the rest, if in the Treaty concerning Theriaque, which I have lately published, I have advanced any thing not consonant to what I have declared here, touching the action of the Venom, I am to be excused therein, forasmuch as I had not then had the occasion, well to know the nature and the effects of the Bitings of Vipers, and referred my self to the most approved Authors about it. But yet all we have there said, I derogates in nothing from the preparation of Vipers for Theriaque, which we have there laid down, and which was in that Book our main design, as well as to reform several other preparations, that seemed not reasonable to us: That which now remains to be done by us, is, to speak of the Remedies to be drawn from Vipers, which may serve to heal their bitings, and to cure many other evils.

THE

THE REMEDIES EXTRACTED FROM VIPERS.

CHAP. I.

*Of the different choyce that
may be made of the parts of
a Viper.*

There is nothing in Nature, to which can be given more justly the title both of *Aliment* and *Medicine*, than to a Viper, since it affords equally very good Nourishment and very good Remedies. It also hath in its Body not one part, which is not very usefull, and of which Artists may not draw something

thing that is good; their chief difference consisting in this, that the substance of the one is more or less close, then that of others. Yet, as in all Bodies of Animals, there are parts preferable to others, so we may make a distinction of those in a Viper, especially if we mean to eat them, or to reduce them to powder, to take it at the mouth, alone, or mingled with other medicaments.

In this case, it will be well, to use only the Heart, the Liver, and the Trunk, I mean, the Body emptied of its guts, without head and tayle. Not that, if you would make use of the head and taile, any ill would attend it, or that you need to fear any ill quality in them, no more than in all the other parts of the body; but the Heart, Liver and Trunk are chosen, as those that are most esteem'd, and which are taken before the rest, out of the body of such Animals, which men use to feed upon. Those also, that would nourish themselves with Viper-flesh boyled and seasoned, may do well, in eating of it, to separate the bones thereof, and to leave them uneaten: but if they bruise them between their teeth,

and

and swallow them down together with the flesh, they would afford them a like, and even a stronger nourishment than the flesh: for, we have found by Distillation, that the Bones yield the same parts, that the Flesh does and even in greater quantity. For the same reason, the Bones of the trunk are not to be cast away, when you will prepare the powder of Vipers, and that the rather, because they are in that way very easy to swallow. One may also very usefully dress the flesh of Vipers with their own fat, as one would do with butter, or with the fat of other animals. The Skin it self, if men would, might be boyl'd and eaten with benefit; but that it would not be so savory, as the principal parts we have been speaking of.

As for the *Chymical* preparations, all the parts of Vipers may be therein employed, and I would not except from them the Stomach it self, nor the Intestins, if they were well clear'd of Worms, and all Excrements.

I also know no difference, as to goodness, of one Sex from the other, although most Authors have prescribed the use of Females: On the contrary, if there be any

any such difference, I would preferre the Males to the Females, when these are full of Eggs, and big, forasmuch as then they are too much wasted for the feeding and increasing of their Eggs.

As to the Seasons, in which they are to be taken and used, I almost equally consider the *Spring* and *Autumne*; for the times wherein men need them, ought to carry it in the behalf of those who have a mind to feed on them. But care must be had to chuse such Vipers, as are bigg, fat, vigorous, and active; and not to keep them very long after they have been taken, because they grow leaner and lesser every day, both out of Melancholy, and want of food, which after that time they use not to take. I also make no difference between those Vipers of *France*, that are bred in one Province, and those of another; for those of *Poitou* and the neighbouring parts are as good as those of *Dassphine* and about *Lyons*, and in other places. The place therefore is not to be considered but for the quantity, and for the conveniency of getting them, in regard that they are not wont to be found in maritime places, which are the onely, that

Authors

Authors have disapproved for Vipers, upon the belief, that the flesh of Vipers, taken in them, did cause thirst, by reason of the saltish food, they met with there.

CHAP. II.

Of the Use of the parts of Vipers, in respect of their nourishing Vertue.

Here is scarce an Author, that hath written of Vipers, but affirms, that in several parts of the World, many persons, and even whole Nations, have fed, and still feed upon the flesh of Vipers; in somuch that in great and costly Entertainments, they made exquisite and very considerable dishes of it. There are also, that have alledged for an example some Nations, which by the use of Viper-flesh, have

have extraordinarily lengthn'd their life, even to 140. years. It is needless, to insert here the testimonies of Antiquite on this subject; the Curious may finde them in Books. We content ourselves to affirm, that many persons do still use it at this time in divers Countries, whether it be from Custom, or to satisfie their appetite, or by the Advice of knowing Physicians, and that upon occasions they finde wonderful effects thereof. I also doubt not, but that the use of it would be more frequent among us, if the vertues of Vipers were well known, and if one could dislodge out of the minde of people the horrour and natural antipathy, they have against this animal. For the taste of Viper-flesh is very like that of Eeles; whence it is, that in some Countries Vipers are called *Eeles of the Mountain*; and one finds something in them even more savoury than in Eeles. I know persons, who well knowing the most inward parts of Vipers, have out of merriment, and in company, made good meals of them, and found it very savory meat. But those that have too much aversion from this kind of food, may find very convenient

wayes to benefit themselves by the vertue of them, so as not to be diverted from it by any abhorrency of the animal: for they may feed Capons and Pullets with the flesh of Vipers cut in small pieces, which those Creatures eat very greedily; and continuing for some time to feed them therewith, it will certainly communicate the vertue of the Vipers to the body of those Animals; which may be eaten, as we eate other Capons or Pullets, the taste of which will be very savoury, because that of Viper flesh is so.

Neither ought we to doubt, that the qualities of Vipers pass into the bodies of those animals, since there are innumerable others, the flesh of which hath not onely the vertue, but even the taste of the things, they are fed with. The flesh of the Birds, that live on Juniper-berries, and of those, that live onely upon Olives, hath not onely their qualities, but also their taste and bitterness, and that so highly, that one can scarce eat them. In the Countries, where Silk-worms are bred, it is observed, that in their season, which is chiefly in the months of *May* and *June*, the Eggs of Hens, that eat those Worms, have

have a taste and smell of them, as well as their flesh; insomuch that nice persons feed their Poultry a part, and hinder them from eating any Silk-worms. It may be taken notice of, to this purpose, that 'tis a custome to givé to Nurses the medicines, which young Children cannot be made to take, to the end that their vertue may pass from the body of the Nurse to that of the Child; and it hath been often observ'd, that the Urine of the Babe hath had the sent of the Druggs the Nurse had taken.

But yet some might phansy, that Animals cannot take the good from the good parts of the things eaten by them, but they must at the same time receive the impressions of the ill ones, that are there; and it might even be objected, that Lizards, Scorpions, Cantharides, and the other Creatures, on which Vipers do feed, should impress in their bodies the ill qualities, they have, as, among the rest, the Cantharid, its Caustique quality. But notwithstanding all this, the Experience we have of the harmlessness of Vipers-bodies, and also of their good qualities, furnishes us with a contrary argument, suf-

ficient to destroy that phansy ; and it teaches us, that the stomach of Animals converteth into good all the ill qualities, to be met with in the bodies, it receiveth to digest ; and that it unites and appropriateth the good ones to the very substance of the Animal that hath eaten them : Whence it comes to pass, that it is as 'twere transformed, or at least very much changed by those good qualities, and is upon that account capable to communicate them to other animals, into whose stomach it enters to be there digest-
ed. We say besides, that there are divers Examples of Bodies, that would be altogether poysinous in the stomach of men, wh^{ch} yet serve for food to, and fatten, other animals, which afterwards yield good nourishment to men. Such are *Hellebore* and *Hemlock*, which nourish and fatten Quailes and Goates, which afterwards are usefully employed for the nourishment of men ; and this is it, what *Lucrece* hath very well observed in these Verses ;

*Præterea nobis Veratrum est acre ve-
nenum,
At Capris adipes & Coturnicibus auget:
Quippe*

*Quippe videre licet pinguis cere sape Ci-
cutâ*

*Barbigeras pecudes ; homini quæ est acre
Venenum.*

But those, that have no aversion from Vipers-flesh, may take of them the Heart, the Liver, and the Trunck, and having washed them well, they may then accommodate them to their own taste in the dressing. Where they are to take care, not to make the flesh too hot by too much spice, especially pepper; but yet they are allowed to put to it some aromatique herbs, as Garden- and Wild-Thyme, and the like; or a little Nutmeg, Cinnamon, Cloves, to raise the taste. They must also avoid the fault, committed by the Antients, whipping and vexing the Vipers, before they killed them; least this irritation should cause some ill impression in their body, which by it self hath no venom at all in it. Let them also not cast away the broth, wherein the Vipers have been boyled, because it retaines the greatest vertue of them. Neither do I see, why one should stint the quantity, or limit the time of the use of it; that depending from the degree

of the illness, and from the constitution of the persons, that will make use thereof. And although we know Vipers to be a very Alterative Medicine, and that their chief use is onely for their Medicinal qualities; yet if taken as an Aliment, there is no danger at all to eat of their flesh, or to drink of their broth, somewhat more or somewhat less. It is also to be moderately salted; and those that have any of the Fixed Salt of Vipers, shall do well to employ it. You may also adde to it some of its Volatile Salt, if you will have the Flesh of Vipers work more powerfully.

As to the *Vertues* of Viper-flesh, according to the consent of innumerable Authors, whose opinion is supported by reason and truth, confirmed by many Experiments; we can say, that they are very great, and that there is no Animal in Nature, that affords such and so many: And we wonder not at all, that the Antients have so frequently employ'd Vipers in their *Hieroglyphicks*, and adorned their *Medals* with them; thereby to design very advantagious things for the publick, and for private men; forasmuch as this Animal is very capable to furnish them. For the

the use of it preserves the natural heat in a very good temper, it repaireth the same, and restoreth it when 'tis altered; it yields a very good food; helps digestion by its heat, which is not excessive; it retards old age and prolongeth life, by a property, which Vipers have, to maintain in good plight the whole habit of the Body. Whence it is, that many have believed, that both Staggs and Eagles, induced to it by a natural instinct, eat all the Vipers, they can meet with, and that 'tis upon that score, that their life is extraordinary long.

There is also ascribed to Vipers, and not without reason, a Renewing virtue, capable to make young again; which they tacitly shew, by casting their skin twice a year, and renewing themselves by the cover of a new skin. This, joyned to the subtle parts, of which the Viper is composed, and to its lively and daring aspect, testifies it to be pertinent enough, that Authors have attributed to it the virtue of clearing and strengthning the Eyes.

Vipers have also a very particular vertue of Cleansing the whole Body, and particularly the Bloud, and of expelling

through the pores of its skin all the superfluities : Whence it may be inferred, that they are very proper to cure the *Itch*, *Tetter*, *Erysipelas* or *Saint Anthonies fire*, *Measles*, *Small Pox*, and the *Leprosy* it self, the use of them being long enough continued; though I cannot well believe what *Galen* saith, That the Wine, wherein one onely Viper is choaked, is able to cure so great an Evil, and which doth not so easily yield to remedies.

Vipers also may, by removing all the impurities and obstructions of the Body and skin, cause beauty therein; and upon this account it is, that many Ladies in *Italy* use them for their ordinary food.

By the good nourishment, they yield by the purity they give to the blood and to all the parts, and by the liberty they give to the Spirits to do their functions therein, they are a great relief to persons in a Consumption, and to those that are emaciated by long diseases, and wasted by tedious Feavers. There are even Authors, who assure, that the use of them is capable to cure the Venereal disease; for which we doubt not but they may serve much, if they do not altogether cure it.

Their

Their mundifying vertue, joyned to the Alexiterial, makes them also very proper to expell all sorts of poysons, and even the Plague it self and all contagious diseases. They are also very contrary to all putrefaction, which commonly is the matter and source of most maladies; whence it comes, that those who use them, are not subject to diseases, unless they live irregularly, which is able to destroy all the good, which the use of Vipers might afford.

We might here specify many other sicknesses, that might be cured by the use of Viper-flesh; but we think not fit to do so, since the general vertues, which we have noted, may suffice to make men apply the use to many particular Evils, that may need it. Yet we shall describe, in the Chapter ensuing, the uses and Vertues of the parts of Vipers, taken as a Medicine, without any great preparation.

CHAP.

CHAP. III.

*Of the Vertues of several
parts of the Viper, and of
their Use in Physick.*

THE Vertues, which the *Flesh* of Vipers is able to communicate to those, who eat them for nourishment, are doubtless very considerable; but they are not the onely ones, that Vipers are endow'd with; and not to alledge superfluous things, we shall confine our selves to the principal Vertues, of which we have experimented the greatest part.

It is very certain, that the *Head* of a Viper, broyled and swallowed, healeth the biting of that animal. The *Heart* and the *Liver* may do the same. Reason and Experience have confirm'd it; and therefore

in

in an urgent occasion those parts may be very usefully employed. The application of the Blood of a Viper to the Biting, as also that of its Head bruised, are neither to be rejected, nor is that of the Entralls: but these applications alone are not capable to cure it; for, the subtlety and quicnes of the Spirits carrying them with great speed into the body, there must be used internal specifick remedies to repulse them; and you may also very pertinently repeat (at the mouth) the use of the head, heart, liver, and the other parts of a Viper, without fearing to take too much of them, because those parts can never do hurt, and they alwayes produce some good effect. They may also serve for all sorts of venoms and poysons; and against all sorts of contagious and epidemical diseases.

Divers Authors assure, that the *Head* of a Viper, hung about the neck, hath a very particular quality to cure the Squinancy and all the distempers of the Throat; and that the Brain of a Viper, wrapt up in a little skin, and likewise hung about the neck, is very good to make the Teeth of children come forth; which effect
others

others believe to be due to the great teeth of Vipers. If we had experimented it, we could then speak with more certainty. The remedies are easily practicable, and without harmles; wherefore those who need them may make tryal of them.

Some also have affirmed, that the *Liver* of a Viper, swallowed, keeps one from being bitten either by this Animal, or by any other serpent, and that the powder of Vipers hath the same efficacy. But we must not rely upon their report; we onely believe, that the Liver swallowed is capable to heal the biting of a Viper; like the heart, flesh, and other parts, of which we have spoken; and that it may much facilitate the delivery of Women with child, as doth the Liver of Eeles.

The *Skin* of a Viper is not altogether destitute of virtue; for besides that it is also, as they say, very good for the delivery of women, making a garter of it about the right leg, it hath a very singular virtue for all the distempers of humane skin: And although all the other parts, eaten, may work the same thing; yet, that we might have benefit from all, we have experimented, that the Viper-skin does perfectly

fectly heal the inveterate mangie of Dogs, making them eat it boyled or raw. It might also be said, that the specks in the Viper-skin seem to signify the marks of the itch or mangy, or, if you will, of the leprosy, which the scales of the skin represent yet better, and so tacitly express its vertue.

Some have believed, that the *Gall* of a Viper applyed, can heal its biting ; but we give no credit to it, no more than to the application of its bruised head. But this we judge, that it is proper for the wound of the biting, onely as it is for all other wounds, and for ulcers themselves, having a great abstersive, mundifying and cicatrizing vertue. It is also very good for the weaknesses of Eyes, above all, for suffusions and films, being taken inwardly, or applied outwardly ; so far it is from doing them hurt.

The *Fat* of Vipers hath very great vertues ; for, besides that it is very good in the dressing of the Viper-flesh (as hath been said) it is able also, taking a drachm of it, to give great relief in Epidemical diseases, and to expell the venom thereof. It is also very useful to facilitate the travel of women ; and to dissipate the swellings of the

the throat, anointing it outwardly therewith. It also much relieves Gouty persons, and serves to resolve nodosities. It unswels all hard and inveterate tumors, and even those that proceed from Venereal diseases; and for this reason 'tis, that *Jean de Vigo* hath used it in the Plaister which bears his name. It is likewise very good for Burnings, pustuls, and all distempers of the skin; and lastly, it is very powerful against all the illnesses of the Sinews, and of great vertue for the parts attackt by the Palsy. We might also adde many other vertues, adscribed by Authors to other parts of the Viper; but we forbear, because we have not experimented them.

CHAP.

CHAPT. IV.

*Of the Powder and Tro-
chisques of Vipers.*

SInce we do not alwayes meet with persons, who, having need to make use of Viper-flesh, are disposed to eat thereof ; it is very necessary to have ready such remedies, that be as well accommodated to the inclination of the Patient, as fitted to remove the malady. The knowledge, which Physicians have had of the great Vertues of the Viper, joined to the difficulty, met with in the point of pleasing Patients, hath obliged them to search for divers Preparations, in which the Antients did not well succeed ; and if we would bind ourselves to their way of preparing the *Powder* and the *Trochisques*, we should loose the principal vertue of the Viper, and retain onely the most useless. For, in the opinion, which they entertained,

ned, that there remain'd alwayes some venom in the flesh of the Viper, if it were not freed therefrom by some preparation or other ; their practice was, to put the flesh of Vipers in some earthen pot, and having luted it, to set it in a Bake-oven, after the Bread was drawn out, and to leave it there, till this flesh was reduced to powder. In which preparation the best of this flesh, which is the Volatile Salt, was certainly dissipated. They also made several medicines with this powder, mixt among other medicaments divers wayes ; of which we need not to enlarge. We shall content ourselves, here to set down a preparation of the *Powder* of Vipers, which shall be grounded on Reason, and shall retain all the vertues of the Viper ; easy also to prepare, and very convenient for the Patient to use.

Take then towards the end of *Apriall*, or in the beginning of *May*, such a quantity of Vipers as you please, Males and Females, chusing big ones, and such as are fat and vigorous, and using none of those Females, which are already big with eggs ; and then prepare those, you shall have thus chosen, as follows : Without whipping and vex-
ing

ing them, cut off, with a pair of sizers, their heads and tailes, flea them, and empty them of all their entrals, of which you are to separate the heart and the Liver, and lay aside their fat for its peculiar uses. Wash the trunks of the bodies, the hearts and livers in clear water, and after that in white wine; then dry them with a very clean linnen cloth, and having put the hearts and livers again into their trunks, tye all the trunks with small pack-thred, each at one end, and hang them up in the air in the shade, and leave them there, till they be well dried; which will be in three or four dayes. After that, cut these trunks into small pieces, and stamp them in a great Brass-mortar with an iron-pestle, and searce all through a very fine hair-sieve, and so keep it for use. This is the right Powder of Vipers, which contains all the vertues; to which may be added a drop of Cinamon-oyle, to give it a good scent.

There are some, who, to make this powder would have the trunks of Vipers cut in pieces, and put together with their hearts and livers in a Glass-cucurbit, and this covered with its head and luted, and

so placed with a recipient, in a very gentle *Balneum*; thereby, continuing that warmth for three dayes together, to draw the phlegm of Vipers, accompanied with a small portion of the Volatile Salt, and to keep this liquor apart; and then to take out of the Cucubite what shall remain there, and of it to make the powder of Vipers.

But, besides *that* this method is troublesome enough; *that* the fire of a *Balneum* is not sufficiently strong to send forth enough of the Volatile Salt, at a time when 'tis not yet loosen'd from its subject; *that* 'tis notwithstanding too much so, not to emit insensibly some small portion, which would afterwards be wanting in the Powder, and which also may exhale out of the water; besides also *that* the Vipers are in danger to be too much dry'd in the Cucurbite, and even to be there rosted in part: We esteem, there is cause to prefer *our* Preparation to *this*, in regard it is much easier, and without any destruction or alteration of the good parts of Vipers, carries away all their superfluous and useless humidity.

¶ You might notwithstanding follow this way

way in part, if you should desire to have good Viper-water; but then you must increase the fire of the *Balneum*, and finish the distillation in much less time, and yet take heed not to hasten the fire too much at the latter end, least the water smell of the *Empyreuma* or burning. You must also, after you have taken out the parts of the Viper, that rest in the Cucurbita, put them into a glass-retort well luted, and set this into a reverberating furnace, dapt and exactly lute to it a great Recipient, and give it a fire increased by degrees, and hotter about the end, to obtain the Volatile Spirit, Salt, and Oyle, that could not rise by the fire of the *Balneum*; which are to be separated and rectifyed, as we shall say hereafter. Then take a portion of this Volatile Salt well rectifyed, and dissolve it in distilled water, and keep it carefully in a well stopp'd bottle, as an excellent remedy; of which you may increase or diminish the dose, according to persons and occasions; and according as you shall have dissolved more or less of the Volatile Salt in it.

Upon this occasion, I thought fit to advertise those, who distill Capons, Par-

tridges, slices of Veal, or other parts of Animals, in a Glass-limbec (as the custom is,) and who employ for that purpose the fire of a *Balneum*, or that of Sand or Ashes; that by a moderate fire they cannot make rise almost any thing but useless flegm; and that, not being able to increase the fire without making the distilled water smell of the *Empyreuma*, they would succeed better, if in this they did, what I was just now saying of the water and volatile Salt of Vipers; and if they joyn'd their water with the volatile Salt of the distilled Animals, in which resides the chief vertue. Those, that have no mind to take so much pains, shall do better not to give distilled waters to their Patients, as the custom is, since they have no vertue at all, if none be communicated to them by the volatil Salt of the Animal,

As to the *Trochisques*, the Antients have as ill invented, and as ill ordered them, as the *Powder*. For, not to stay to blame here (as I have done elsewhere) the whipping, which they used, and which was not onely useless, but also very noxious; I shall say in a few words, that the decoction, they made of the body of the Viper

Viper in Water, with Salt and Anise, till the flesh would sever from the bones, which they afterwards cast away as well as the broth, was not a *Preparation* of the flesh of the Viper, but rather a *destruction*, since it was made to leave its principal vertue in the broth; and that they weaken'd it yet more, by incorporating it with very dry bread, of which the proportion of a fifth to four times as much weight of flesh, though but little in appearance, came yet to a moiety, since that four ounces of this flesh, and one ounce of bread (which was so dry that it could not be lessened) make onely two ounces of *Trochisques*, when they are well dry'd. This we have more at large examined in our Treatise of the *Theriaque*; and because their fault is very easily understood, I shall insist on it no farther; nor on their reasons for making use of Boyling to correct a malignity in the flesh, (of which there is none) and to be able to sever it from the bones, which they believe naught, or at least unusefull, which yet are very good; forasmuch as all their reasons are sufficiently refuted in the same Book, and because they are yet more so, by what we have establish'd in this.

And

And although it be not alwayes necessary to make *Trochisques* of Vipers, since we might be without them ; yet there being some use of them , and to preserve their name, you may take a little Gumm Arabique, very white and pure, and reduce it to powder, and infuse it in good Malvasy , till it be well dissolv'd, and the wine somewhat tinged thereof: then take of the powder of Viper, prepar'd as we have lately directed, and incorporate it with a sufficient quantity of this gumm'd Malvasy , braying them together in a Marble-mortar with a wooden-pestle, and so reduce the whole into a somewhat solid paste; whereof make *Trochisques*, of the size and shape you please, and dry them in the shade upon a hair-sive.

I said, that we might be *without* *Trochisques*, because that having the Powder, which they are made of, that may suffice for our uses ; but there is one inconveniency in the Powder , in that it will scarce keep any considerable time, especially if it be not well stopt up, and if, besides, some art be not used to hinder the breeding of worms in it : Whereas *Trochisques*, being made compleat by the addition

dition of Malvasy, and by the close compression of the parts of the Powder, they are not so easily penetrated by the Air, nor so subject to corruption. The Trochisques being dry, they may be slightly rubbed over with a little Balsom of *Peru*, which will give them a good scent, and help to preserve them.

The Use both of the Powder and Trochisques is excellent and alike; but the Trochisques are to be reduced into powder, when they are to be used. Neither of them have an ill taste, and they contain all the vertues, we have ascribed to the Flesh of Vipers, as having lost nothing in drying, made without the heat of the Sun-beams, but a superfluous moisture, wh ch could serve for nothing but corrupt them, if it had remained. They may be given in cordial waters, broths, wine, or some fit decoction, or you may make *Bolus*'s of them with Syrrups, Conserves, or Cordial Confections, or turn them into tablets with sugar.

Their main effect is, to purify, open, penetrate, and to drive to the extremities of bodies all venom, corruptions, impurities, superfluities, and they may be very beneficially

ficially used in many occasions for divers maladies, without the fear of any ill success. For both have this quality, that they do alwayes some good, but never any harm. Their dose is from a Scruple to a drachm or two; and they may be given to all ages, and sexes, and at all times.

C H A P T. V.

Of the Salt of Vipers made by the Ancients.

Among many different Preparations of the Salt of Vipers, made by the Ancients, of which we finde the descriptions in their Books, there is none more famous, nor that hath been longer in use, than one that is very ample and much enriched by many Alexiterial remedies; whence tis also, that they gave to this Salt the name of *Theriacal*. But having considered this pompous Preparation,

on, we do not wonder, that a much esteem'd Author hath not given it his approbation, since we cannot finde any thing in it, that is according to rule or reason, no more than there is in the rest. We finde, that the sentiments of that Author proceed from an understanding so judicious, and so knowing, that we cannot but subscribe to them, almost in all: For, in the Calcination, they used, there remain'd nothing but the *fixt* Salt, which contains but ver-ry little vertue; Vipers, as all sorts of Animals, having but little of *Fixt* Salt, whereas they have much of the *Volatile*, which soon riseth in the Calcination, and carries away with it the principal and the most essential vertue of the Animal. They were also much mistaken, when they thought, that *four* Vipers, which they burn'd with *fourty* pounds of *Sea-salt*, or *Sal Gemmae*, or *Sal Ammoniac*, (as some would have it) and with a great quantity of Simples, should communicate great vertues to these Salts and these Coales. For in the Calcination, which they used to make in an earthen pot luted, with its cover on, and yet in one place pierced, the *Volatile* Salt of the four

four Vipers would certainly fly quickly away ; and if it had stay'd (which yet we do not grant) and there had been half an ounce of it (which is a quantity beyond what the four greatest Vipers could yield,) what, I pray, would that be to 40. pounds of Sea-salt, and to many pounds of Coales, more than a small rivolet mingled with the Ocean : But as to the fixt Salt, four Vipers are not able to afford half a Scruple of it.

'Tis also certain ,that both the Sea-salt and *Sal gemme*, do not perish in the Calcination, but still remain there. But if ordinary Salt Ammoniac be employed, the Urinous and Volatile part, which is in that Salt, will not fail to make its escape, as well as the Volatile Salt of Vipers, and there will onely remain the fixt Saline part of the Salt Ammoniac, mix't with some terrestrial parts ; which is that, we finde in the Distillation, after we have driven out all the Volatile Salt, of which afterwards, changing the vessel and the fire, we draw an acid spirit, very much approaching to that, we draw out of Sea-Salt, by wayes almost like these.

Artists know also, that Herbs, Wood, Horns,

Horns, Bones, and other such like matters, if they should be calcined in an earthen pot, luted and covered, though a hole were left in the cover, would alwayes be afterwards found in the form of very black coales, although they had endured a great fire; and that the Salt cannot be separated from them, unless they be calcin'd again in an open vessel; or they being reduced to ashes, the Salt be then sever'd from them by a Lixivium, and by Filtration.

On which occasion we relate an Example of an imperfect Calcination, which is naturally made in the Earth about the Summer-Solstice, of the end of the root of many Plants, and among others, of *Mugwort* and *Plantain*; on which end, the subterraneous Fire, or, if you will, the Fire of the Sun, working, and yet being surrounded by the Earth, (which is to the root what the earthen pot, luted, is to the Vipers, and to the Mixts, that were shut up with them) burns it and reduces it to coales, but cannot turn it to ashes. I have often found this to be true, and lighted upon a little coal at the end of the root of those Plants, at the time above-mentioned.

So that, although the Fixt Salt of the added

ded be Simples in the Coales, yet it would have been more proper, and more methodical, to have quite calcined those coales to reduce them to ashes, and so to draw from them and to purify the Salt for use, than to make people swallow the gross, earthy, and useless part of these coales.

Those Antients added to this pretended Salt calcin'd, the powder of many Alexiterial Druggs, which not being deveseted of their vertue by any calcination, may communicate, and even alone furnish the greatest part of the good qualities, by them ascribed to this Salt. And 'tis upon the account of these principally, that the name of *Theriacal* may belong to it, which impertinently would be attributed to the Vipers, since they have lost their prime vertue in the Calcination.

This Preparation of *Theriacal* Salt doth sufficiently shew us, that the Antients did not take pains to know the inward parts, of which mix't bodies are compounded, and that they did not well know the nature of the poysen of Vipers, of which they imagin'd they should be infected by the fumes proceeding from their Calcination; although none could come from them,

them, when there was none, as we have made appear. And although the smell, as well of the Vipers, as of the Simples, were troublesome, whilst they burned, yet they were not therefore at all venomous.

The little knowledge, which the Antients had, and many Moderns still have, of the nature of the two Salts in Vipers, hath led them into a great fault, viz. to calcine the bones of Vipers, to draw from thence, as they thought, the true Salt of Vipers, which they were not at all like to finde, after they had dissipated it by Calcination. The first fault hath drawn after it a second; for the small quantity of *fix't* Salt, they found in them, not much satisfying them, carried those, that had no great sense of honour or conscience, to a very great abuse, which was, to mix among those calcin'd bones a great quantity of Sea-salt, to dissolve this Salt, and to boyle all together in water, to filter and coagulate it, and to sell at a great rate this Counterfeit salt for true Salt of Vipers.

But, to accommodate ourselves to those, who, intending better, will make

no

no ill use of it; and to furnish them with a pleasing Salt for those, that may desire it for ordinary use; we shall here deliver the way of preparing a Salt of Viper, that shall have much vertue; the method of which shall be very easy, and the use very convenient.

Take three dozen of great Vipers, well chosen; cut off their heads and tails, flea them, and empty the bodies of all their entrals, and wash them well, together with the Heart and Liver: Boyl all together in ten pints of common water, so long till all be perfectly boyled. Then strain it, and squeeze well all the parts; and in this decoction dissolve four pounds of Sea-salt; and carefully filter it; afterwards, coagulate, or, if you will, chrystillize this Salt, which will be found white and abounding with the vertue of the Vipers, and of no ill taste at all; which you may use in all things as common Salt.

And to shew, that these boyled and squeezed parts have left much of their vertue in the Decoction, and yet that they have not left all, and that still there remains some of it; principally in the Bones; lay them abroad, and dry them, and then distil

distill them, and you will draw from them, especially from the Bones, a Volatile Salt and oyl, but in much less quantity, then if they had not been boyld.

If you would have a Viper-Salt of more vertue, and that might even be call'd *Theriacal*, you must proceed after the same manner, as hath been lately set down; but in stead of Seal-Salt, take a like quantity of Salt, drawn from *Alexiterial* and *Theriacal* Plants, as the roots of *Valerian*, *Imperatoria*, *Angelica*, Leaves of *Scor-dium*, the little *Centaurium*, *Carduus Benedictus*, and the like. 'Tis true, that this Salt is a little more displeasing to the taste than the former, but it may produce more considerable effects, and be used in extraordinary occasions.

These sorts of Salt have indeed good vertue, and are convenient for lasting, especially the two first: But the Volatile Salt hath something more particular, and considerably better: the properties of it are innumerable, and it is an *Epitome* of the excellent qualities, contained in Vipers. We shall now speak of its Preparation, as also of the Phlegm, of what is called volatile Spirit and Oyle, which accompany it;

it; and of the *Fixt Salt*, which remains after distillation, mixed among the terrestrial parts; and that done, we shall treat of their vertues and usefulness.

CHAP. VI.

*Of the Volatile Salt of Vipers,
and the Fixt Salt, and
other parts, which are se-
parated by Distillation.*

WE make here publick our Preparation of the *Volatile Salt of Vipers*, with the more frankness and clearfulness, because we esteem it one of the best Medicines in Phyfick. 'Tis true indeed, that some Authors have already spoken of it; but there is none, that hath described it with more exactness, than we

we, nor that hath more desired, that every one might, according to this Method, obtain for himself and his occasions a remedy, which goes beyond many others, to say no more. We hope, that our way of proceeding will be well received by all, and that, if there be any that shall finde fault with it, they will be such only, who are unwilling to communicate what they have, and often wrap it up under the name of *Secrets*.

Take onely the Bodies, Hearts and Livers of Vipers, or, (to have the more benefit of all) add to them the Heads, Tails, and skins, and generally all the parts of a Viper; of which you will have a care to take away all the Excrements and Worms, as also the Eggs, that may be in the *Matrix* of the Females. Small and great, Males and Females are of the same goodness, as also the Salt is, that shall have been drawn from all the parts of the Body. Dry in the shade all these parts separately, then cut them into bits, and fill with them your Glass-limbec up to the neck, which is to be well luted. Put it in the midst of a Reverberating furnace, proportion'd to its bigness, cover it with its

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head

head, and shut the Register of it; Fit to the Limbec a Glass-recipient, which must be very large; and lute well all the joynts. Then begin to give a small fire, which continue for about two hours, so that the Limbec be heated gradually, and the Phlegme begin to distil into the Recipient. Afterwards increase the fire gently unto a second degree; and give a little opening at the Register, and continue the same fire likewise two hours; then increase it, opening the Register yet more, and so continue two other hours; at the end of which you are to give it the fire of the last degree, quite opening the Register, and you must continue to drive the fire, till no more come out of the Limbec, and the Recipient be all obscured by the Volatile Salt, which will stick to its sides, towards the bottom, and to the upper part. Then let the vessells cool, and the Furnace also; after which you are to un-lute the Recipient, wherein you will finde the Phlegme, that part which is called Spirit, the Volatile Salt, and the Oyle mingled together; except a part of the Volatile Salt, that may yet adhere to the upper part, and to the sides of the Recipient, which you may dexterously

terously take away, and, if you will, keep for use, as 'tis. This Volatile Salt, Spirit, and Oyle, are so penetrating, that you are not able to hold your nose over it.

Powre out, what you find in the Recipient, into a Gloss-Body, which must be large, tall, broad below, and whose figure goes up straightning towards the orifice; to which you must adapt a Glass-head, that is to have somewhat a high body, and large, and a very straight mouth, and proportioned to that of the Glass-body. Lute the joynts exactly with paper and starch; put the Body in a Sand-bath, and sink it down as low as the matter reacheth; fit a small Recipient to the beak of the Head, and lute that also: kindle under it a very gentle fire, and order it so, that the Sand and the Glass-body may be heated gently; after which you may increase it a little, but onely so as to make it strong enough to drive up the Volatile Salt; which, being dis-engag'd from the parts of the Vipers bodies, riseth easily. It will be sublimed, and stick every where to the inside of the Head, like a Chrystallized Snow. There will arise at the same time a little of the Spirit, which is properly nothing

but a portion of the Volatile Salt, having carried up with it a little of the Phlegme, that will run into the little Recipient, and of which even a part will congeal into Chrystals. You must alwayes be careful in managing the Fire; for how little soever you increase it, the Phlegme will rise with some of the Oyle, and they will dissolve and hide the Salt; and then you must recommence the Rectification; but governing the fire well, when you shall see the Head well lined with Salt, which will be very white and very Chrystalline, you must then un-lute it, and take it off, and lute on an other head, instead of the former. You are to take out the Salt, as soon and as well as you can; and to enclose it in a strong bottle, with such a mouth, that the Salt may pass through it, and which may be exactly closed, without which the Salt will easily fly away. Mean time, you are to continue a like fire under the Glass-body, and when no more of that Volatile riseth, you are to desist, and to take out of the head the Salt there gathered, and keep it as the former. Your Sand being cold, take off the Glass-body, and decant from it the remainder through a great Glass-

Glass-funnel, covered with paper for filtration, held over some vessell. All the Phlegm will pass thorough the Paper; but you'l finde some Oyle there, that cannot pass, which you may make run through the Funnel into a bottle, having pierced the paper with some convenient instrument.

Those that shall desire a high and much more perfect Rectification of this Volatile Salt, may make it in manner following. Take two pounds of Ivory calcin'd to whiteness, and reduced to a fine powder; which is to be mixt with four ounces of this Salt. Then put all into a new Glass-Body, of the same shape with the former. To this let there be adapted and luted a blind Head, or such an one, the extremity of whose beak is well stopp'd (for *that* is useless for this purpose, there being no phlegme; and if there were, the calcin'd Ivory being a dry Body, and in part spungy, wou'd lick and retain it, as it would also the Oily part, that might happen to be among the Volatile Salt:) let there be given to this Glass-body a moderate Fire, with the same cautions as before; the Salt will quickly rise, and stick to the Head;

Where, the Sublimation being ended, you will finde it in the form of Chrystals, white like snow; which you are to put up and keep in a bottle exactly closed, to use it upon occasion. This Salt thus rectified smells not of Fire, and hath nothing but its own natural strong and penetrating scent.

There may perhaps be found Artists, who will take it ill, that we have been so large and so particular in exactly setting down all the things, that are to be observed in preparing and rectifying this Salt. But it is not for them, that we have done it, but for those, who not knowing it will be glad to learn it. We have given them sincerely the true means used by ourselves; which they may also practise in preparing and rectifying the Salts of the parts of all Animals. Those that have any tincture of Chymistry, will here find enough to teach themselves; as we have done, and do daily. Mean time they must not be offended, that there remain with us upon this subject such things, which could not be said, nor well comprehended but by those that have labour'd a great while in this Art. Intelligent persons, that shall

shall examine our proceeding, or have a mind to experience the same, will find our ingenuousness, by finding the success of all we have made them expect, together with the facility, we give, of the Operation. They will also find, that our way of filling the Retort as far as the neck, is more proper than that of leaving a third part empty, as some would have it, in the Distillation of the Bones, Horns, and other dry parts of Animals; although those, that understand it, practice it not but in matters that will melt, and may break the Retort, or let something run out by the beak, when 'tis fill'd too high. But in dry substances, as are our Vipers, and the Horns, and Bones of Animals, Crabs-eyes, Stones, and the like, it is enough to leave this neck empty, to give vent to the parts raised from the matter, and that are to go into the Recipient. They will also acknowledge, that our way to leave the Oyl among the other substances, when we will sever them by subliming and rectifying them, is not without reason, in regard that the Oyl hath commonly with it much Volatile Salt, which leaves it, and afterward riseth in the Rectification.

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We esteem also, that this Preparation will be preferr'd before many others, that are operose and haye little method in them; and, among others, before the Rectification, which some pretend to make by the addition of Spirit of Salt to the Phlegme, and to that which is call'd Spirit, and to the Volatil Salt: which instead of rectifying this Salt, and of making it purer and better, changes its nature; and instead of subliming it to the Head and the top of the Body (as they have pretended it did, after the Phlegm was risen,) the Spirit of Salt riseth it self in its first form, in its smell, colour and taste; leaving at the bottom the Salt, which is there found like fixed, having the tast and the other qualities of the Spirit of Salt, but being lessen'd of two thirds of its weight. That kind of men have fill'd Books with many Preparations they understand not, nor have experimented: For, forgetting, among other things, in the proceſſ of this, such methods as are absolutely necessary, and without which they do nothing, they promise impossible successes, and putting the Cart before the Horses, they fix the Salt when they pretend to sublime it, and so

so very unadvisedly prostitute themselves to shame and confusion. For, instead of rectifying first the Volatile Salt (as more intelligent men might have taught them, of whom they had borrowed this Preparation) and of subliming it, and of separating it by this means from other parts; they labouring to disguise the Process, have retrenched the main and most necessary part of it, and employed at the very first that method, which they should have observ'd to fix it, believing that that would sublime it; not considering, that having by that means inverted nature, the success would prove answerable to it. I set a side their unwarrantable practice of adding a pound of luke-warm water among the substances found in the Recipient, after the first distillation, since it is an Augmentation, not onely useless, but troublesome, of that Phlegme, which must needs be separated.

Now, although one part of this Salt, remaining in the Body of the Limbec, may yet afterwards becom Volatil, by mixing it with some Lixiviat Salt, and making it to sublime; yet *that* is not done but with a new and very great loss of its weight;

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nor is the taste of it better than of that, which shall have been well rectified according to the method, we have before described; since the Lixiviat Salts, by reviving it in part, give it as displeasing a smel as the former. We may further add here, that the use of tall and strait-neck't Bodies is much more proper for this Rectification, than the use of Matrasses with long necks, myself having experimented, that the Phlegme fals back again more easily, and that the Volatil Salt riseth purer in the Bodies of our fashion; of which the *Figure* may be seen on the *Title page*, where also is that of the Retort and the Recipient, for the first Distillation.

Now although the same men, that have given us cause to reprehend them, have affirmed contrary to truth, that there is no *six't* Salt in the parts of Animals: To prove that there is, and to benefit by that of the Viper; Take what shall remain in the Retort, commonly called the *Caput Mortuum*, which you will find of the form and colour of Coales; calcine it in a Furnace, or, to save expences, in a Potters Oven, till all become white and of the form of Chalk, pulverize it well

well, and make it boyl in a competenc quantity of water, that may receive and dissolve the Salt; filter it, and make it euaporate and consume. You'l find at the bottom a coagulated Salt; though in a small quantity, and such an one, as that of five pounds of Viper-bones well calcin'd, we have obtain'd no more than three ounces of fix't Salt. This Salt hath a very sharp and poynant taste; it is Lixiviat, and approaching enough in diuers regards to the fixt Salt of Tartar. You'l find on the Filter the Terrestrial part, stripp'd of all its vertue; which then may justly be call'd *Caput Mortuum*. And thus you'l have the Phlegme, that which is call'd Spirit, the Volatil Salt, the Oyl, the Fixt Salt, and the Earth; into which all the parts of the Viper have been reduced in their separation.

C H A P. VII.

*Of the Fixation of the Volatile
Salt of Vipers.*

Although the Volatile Salt of Vipers have in it, to speak truth, nothing offensive, but its strong and piercing Smell, and that those, who shall take into their mouth the weight of a good number of grains, cannot receive from it any other trouble but that of this Sent, which yet soon passeth away, this Salt leaving afterwards a saline and very agreeable taste; yet notwithstanding many persons, offended with the piercing odour, which is first perceived in this Salt, and besides dissatisfied with its easy Avolation, unless it be extreamely well closed, have endeavoured to fix it, and so to free it from this smel, not considering that this smel cannot be altogether separated from this Salt, but its vertue must be so too, and that the fixation changes its nature: And instead of contending

ting themselves to rectify it well, thereby to carry away; as much as may be, the adventitious smel, which it may have acquired by the violence of the fire by the first distillation, they have sometimes altogether destroyed it, and have dealt with it, as if one would deprive *Musc* and *Amber-gris* of their good sent, and *Coloquintida* of its bitterness; and many compounds of their operations, which would not be what they are, if you should robb them of the least of those parts that compose them.

We say therefore, that after the Rectification of this Volatil Salt, (such an one as we shall set down beneath,) the best and surest preparation would be, to do nothing else to it, but to make it to be used in that condition, only mixing with it things accomodated to the Patients taste, or with such other remedies, as do not change its nature, nor make it loose any thing of its force or vertue.

If the Fixed Salt of Vipers were capable to arrest and retain the Volatil, there were then nothing to be said against this fixation, because having been both formed jointly and in the same body, they have

have no aversion to, but rather are able to help one another; But this common origin, and this friendship which they have contracted, whilst they lived together in one and the same subject, hinders them from destroying one another, and maketh, that what is Fixe can nor will change the nature of the Volatil. And indeed, although you mixe them together, and that the quantity of the Fixe be five or six times greater than that of the Volatil, and that they may also lodg with one another; yet they both equally keep their nature and vertue, and they may be separated by fire, and manifest at all times their several and distinct vertues. But this hinders not the taking one Salt among the other, nor that the Fixe should not then borrow somewhat of the subtily of the Volatil, the better to penetrate the Entrals and Vessels, to open the more vigorously the obstructions, and to expel the impurities, it meets with, by siege or urine; and that, on the contrary, the Volatil Salt, helped by the Fix't Salt, shiould not carry away and drive out through the pores of the skin or other ways, the more gross and more viscous parts of the humors, that perhaps might have

have escaped its quick and subtile operation: For which uses, both Salts may be mix'd together upon occasion, without undertaking an impossible fixation.

But especially, the fixing of this Volatil Salt by *Quick-lime* cannot pass with all Artists but for an operation altogether destructive to it; and 'tis that, which is most of all to be avoided, because not only it carries away the smel, taste, and vertues of this Salt, but quite changeth its nature, and converts it into its own, by petrifying the same.

The Fixation of this Volatil Salt, by the Spirit of Salt, although it seem to destroy it and change its nature, in that it carries away the smel and taste of the Volatil Salt, may notwithstanding be admitted rather than the other, in regard that the Spirit of Salt, by preserving the vertue it hath to open all the obstructions of the inward parts, working upon the Volatil Salt, may appropriate to it self something of its vertue, especially that which is able to second its action, and to expel together with it, by urine or other ways, the most tenacious and most stubborn humors. Those that would expel the humors

mors by these ways, may usefully prepare it after this manner.

Mix four ounces of the Volatil Salt of Vipers, well rectifyed, with four ounces of Water; put them into a Glass-Cucurbita Somewhat high, of a narrow mouth, broad and flat towards the bottom, holding about two pints. Fit to its mouth a Glass-funnel, the end of whose pipe is very narrow: Lute the funnel quite round about the orifice of the Cucurbita, so that there may be no other aperture but that of the end of the funnel. Then powre, little by little, and drop-wise, some Spirit of Salt well rectifyed upon the Volatil Salt. At first there will be a conflict betwixt them, which will cause an ebullition, but that of a short duration. Continue to powre upon it of the same Spirit of Salt, gently and leisurely, according as you find the ebullition cease, and by intervals stir also the Cucurbita; and repeat this so often, that at last there appear no motion any more, and the Spirit of Salt have as 'twere mortified and fixed the Volatil Salt. Then place the Cucurbita in some receptacle furnish'd with Sand; fit to it a head, lute it (though at the

the beginning that be not necessary) and by a slow fire draw away all the moisture of the Spirit of Salt, and of the Volatil Salt, which will rise almost insipid. Continue the fire still, and when you shall perceive a taste of the Spirit of Salt in what shall be distill'd, change the Recipient, increase a little the fire, and drive it (yet without too much violence,) until there distil no more, and that the Salt remain at the bottom of the Cucurbite altogether dry and of a gray colour. You'll find in the Recipient a Spirit of Salt of the same taste, of the same colour, and of the same force it had when it was powr'd upon the Volatil Salt; but you shall not find any part of the Volatil Salt risen to the head, nor to the top of the Cucurbit, as some have given out it doth, without having experimented it, as we have done. The gray Salt, found at the bottom, is but in a smal quantity, being lessen'd almost of two thirds: It's taste is very sharp, biting, and much differing from what it had before it was fix'd, and as 'twere mortified by the Spirit of Salt. After this you may dissolve this Salt in water, filter it, and make it evaporate, and letting it cool,

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you'l find at the bottom a smal quantity of Salt coagulated in the form of Chrystals. Powr out by inclination the water swimming on the top, to have the Salt by itself, which you may dry in the Air, or the Sun, or over a little fire. You may also make good use of the Salt that shall have remained in the water that swam a top, by making it evaporate in part, Chrystallizing and drying it, as the former. You might, if you pleased, very well omit luting the Funnel upon the Cucurbit, when you will powre the Spirit of Salt upon the Volatil Salt; forasmuch as we have found by experiment, that in the operation of the Spirit of Salt upon the Volatil Salt, there riseth nothing but phlegme, that hath neither vertue nor smel; although the same persons, that have err'd in many things in the rectification of the Volatil salt, have fear'd they should loose therein a Volatil spirit, which was only in their imagination: And the luting, which we have advised, was only to prevent peoples belief, that a part of the Volatil Salt might have escaped that way.

But although this Volatil Salt appear fix't, and remain as such at the bottom of
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the Cucurbit, after distillation; yet there is a part, which recakes its former nature, and becoms Volatil again, if it be mix'd with Salt of *Tartar*, or with some other Lixiviate Salt, putting them together in a subliming vessel. For these *Lixiviate Salts*, being of a nature contrary to *acid Salts* and *spirits*, do mortify them and retain them to themselves, and let go the Volatil Salts, which the *acid spirits* had, as 'twere, mortified and fix'd, and all that was Volatil in this seemingly fix't Salt, riseth in a white form, and hath almost the same taste and the same other qualities of the Volatil Salts well rectified. Yet you will also find there a great diminution of its weight, so that it will be more advantagious to keep it in the condition, it was in before this last sublimation; the greatest advantage of which is, to come to know, that the fixation, that hath been made by the Spirit of Salt, although it have as 'twere changed the nature of the Volatil Salt, and hid its diaphoretique quality under that of the ditretique, yet hath not quite destroyed it, since there is some part, that can retake its pristine form and vertue.

This Salt thus fix'd possesseth the vertues of a Spirit of Salt concentrated, but they are found augmented by those, it hath borrowed from the Volatil Salt. Those, who would only carry away, by urine or siege, the superfluous humours of the body, may usefully prepare and employ it; but those, that shall use the Volatile Salt well rectified, without changing its nature, nor diverting its action by any fixation, will finde therein such effects, as will be incomparably more apparent and more sensible, and will not waste of it so much.

CHAP.

CHAPT. VIII.

Of the Vertues of the Volatile Salt of Vipers, and of what the other parts, separated by Distillation, may perform.

THE Volatile Salt of Vipers is to be consider'd; as a Sun, as well among the parts, that rise by distillation, as among those that rest in the Retort; there being none among those that are come over, but have borrowed from it almost all the vertue it can have; nor any of those that have stay'd, but have need of it, or are uselesse without it. The *Flegm* that riseth first, carries alwayes some part with it, without which it would produce no effect. That which is called *Spirit*, is nothing else, to speak aright, but a Volatile Salt, which in the distillation

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hath been followed by a little Flegme dissolving it, and giving it the form of a Spirit: which may be shewed by the Rectification, wherein that saline volatile part is separated, raised, and coagulated into a white and chrystalline forme, and leaveth at the botom of the cucurbite the moisture that had changed its nature, and is nothing else but flegm. We say, on this occasion, the same thing of what many Authors improperly call the Volatile Spirit of an humane skull, of Harts-horn, and of other parts of Animals, they being nothing else but Volatile Salts mixt with flegme, which they afterwards quit, when they are rectified. The *Oyle* also would have but very little vertue, if it borrowed no Volatile salt, and if it retained not in it a good part thereof, as may be observed in the Rectification: for, if the *Oyle* were measur'd, or weighed, before 'tis put among the rest into the cucurbite for rectification, and if it were weighed again after that all the Volatile Salt is risen, it would be found much diminished in quantity, and in strength also, because most of the Volatile Salt, which had joyned it self to it, hath been carried away by the rectification.

tion. So those, that separate the Oyle from the other parts to rectify them, and who use it not but for wounds or ulcers, and to take away superfluities, do doubtless not know it aright ; for it is also endow'd with other vertues more considerable; of which we shall speake in this *Chapter.* The Fixt Salt, which rests in the Retort, mix't among the terrestrial part, although it is to be put in the rank of Lixiviat Salts, and possesseth few other qualities, but those of Salt of *Tartar*, yet retains something of the nature of the Volatile salt. And those, that have considered this Salt as a *Caustick*, have had good success with it, without knowing its nature, seing they imputed it to the maligne parts, which they believed to be in Vipers, whereas they should have ascribed it to the nature of Lixiviate salts. But this Salt being taken at the mouth, will be much more effectual, if you mingle some Volatil Salt with it ; this Caustique faculty not hindring but that it may be taken safely and beneficially in appropriated liquors, as many other lixiviate Salts are.

The *Terrestrial* part hath nothing in it, that deserves to be considered, and it may

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Justly be called *Terra mortua*, Dead earth, after it is freed from its fixed Salt. So that all the parts, that rise by distillation, as well as those that cannot rise, are of small force, or altogether useless, without the Volatil Salt. It is therefore upon good reason, that we attribute to it the principal vertues, which a Viper can furnish.

The similitude of substance, which the Volatile Salt of Viper hath with the spirituous parts of our Body, conjoyn'd to its subtile and piercing quality, maketh, that accommodating itself to their condition, and finding all liberty in its actions, it produceth all the effects, it is capable of, and penetrateth without any opposition into the most secret and the most remote parts of the Body. It hath this peculiar, that though it act as a Sovereign, and finde nothing of resistance to its dominion, yet it exerciseth it not as a Conquerour, nor as a Destroyer, but rather as a Restorer of the places and parts, where it passeth; and although all its courses be extraordinary quick and precipitate, yet they are so well measured and so well directed, that no part of the Body misseth them, and that none of its steps is unuseful, but rather very beneficial

neficial to all the places, where it passeth.

Now since the flesh, the heart, the liver, and the other parts of the Viper, taken as an Aliment, or as a Medicine, may serve for the cure of many maladies, and produce very considerable effects ; 'tis not at all to be doubted, but that this Salt, which is the most subtile and the most potent of them all, is something more sublime and more efficacious. And we are assur'd, that if it were well known to us, it would pass for an almost Universal medicine; men would be careful of preparing it, and we should see it often prescribed by Physicians, and find it succeed in innumerable obstinate diseases, that are but seldom and difficultly cured.

To Judge well of the Effects, which this Volatile Salt can produce in our Bodies, we must know its manner of operation, which is, to open, to comminute, to attenuate, to pierce, and to drive to the extreme parts of the Body, and through the pores of the skin, all the impurities, and all the strange bodies, that can get out by those wayes. Further, it is an enemy to all corruption, very friendly and very agreeable

able to our nature, which it assists and fortifies, enabling it to expell, not onely by the pores of the skin, but also by siege and urine, and by all the Emunctories of the Body, the superfluous humors, which molest it: Whence it comes to pass, that it produces admirable effects upon a thousand occasions, curing a great number of sicknesses, or at least giving great relief therein, even in those, that are most refractory, and most difficult to cure; such as are Apoplexies, Lethargies, Convulsions, Palsies, and many other maladies, believed to have their source in the Brain. It is also a great relief to the Distempers of the Breast, as Swoundings, Palpitations of the Heart, Difficulties of Breathing, and Pleurisies. Besides it particularly unstops the Obstructions of the Liver, Spleen, Mesentery, and other parts of the lower Belly. It dissipates all inward impostumes, in their rise, and dislodgeth secret and unknown pains, which have their origin in the Spirits. It helps digestion, the purification of the mass of the blood, and its distribution to all the parts of the Body, and resolves and prevents coagulations: And so being an Enemy to all corruption, it is very proper for

for all sores of Fevers, caused thereby; as for most intermittent Feavers, and particularly *Quartans*. It also worketh powerfully in the distempers of the *Matrix*; and is a remedy to all the vices of the skin, and to the Leprosy it self: but above all, 'tis specifique against all Bitings and stings of venomous creatures, against all venoms and poysons, if they be not corrosive; for in that case, recourse must presently be had to Vomitives and to Unctuous things, after which it produceth good effects. It hath a particular vertue against the Plague, against all Contagious diseases, and Epidemical ones, such as are the Measels, Small Pox, and the like. In a word, the Inductions, we can draw from the great number of Experiments, we have seen of it, at different times, oblige us to affirm, that its vertues goes beyond what can be expressed. And those, that shall make reflexion on what we have said of it, will be able to apply and use it beneficially to many other sicknesses, which to enumerate would be too prolix and too tedious.

In the mean time, we cannot forbear to relate here a very remarkable Experiment, made upon a Gentleman, who suffered
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about a month since, a violent and continual paine, doubled and redoubled, at the right part of his front pretty near the Temple: the end of a finger might cover the place of the pain; there appeared no redness nor swelling, and there was perceived no hardness. Yet the pain, though it was, as 'twere, fixed in a point, was communicated to the other neighboring parts, so that the Gentleman could not chew, nor so much as open his mouth to take down a little broth, but with extreme pain, though hunger urged him. The Physitians, that saw him, had used several means to relieve him, and, among the rest, *Venæ-sections* in the arm and foot; they had purged him often; they had employed frictions of his neck and shoulders; they had applyed to him *Velicators*, and *Snailes*, behind his eares: they had caused his temporal artery to be open'd, and drawn from him ten or twelve ounces of arterial blood, and then cauterised the Aperture; they had also prescribed him powerful *Sudorifiques*, which were continued many dayes morning and evening, and had made him sweat very copiously; and the Patient himself, of his own accord, being extremely pres-
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sed by the violence of the pains, caused one of his upper teeth, which was very sound, to be pulled out, hoping thereby to give some vent to them: But after he had used all these means in vain, one dose of the Volatil Salt of Vipers, given in wine, remov'd presently all the pain, which caused as great a wonder in the Assistants, as satisfaction in the Patient. This so surprising effect, which demonstrateth better, than all reasons, the force and efficacy of this Volatil Salt, may also conclude the discourse of its Vertues.

There remains now, that we say something of the vertues of the *Oyle*, which riseth by Distillation with the Volatil Salt, of which it also retains a part. Its strong sent is the cause, that it is not often employed; whence it comes, that sometimes it is more advantageous to the Preparer, to profit by the rectification of the Volatil Salt, which it hath, than to keep it in its condition for Patients that shall use it notwithstanding its strong smel and ill taste. This smel is so intimately sticking to it, that there is no rectification, able to remove it. But we make herewith known to all those, that shall be able to com-

comply with the use of it, that it is one of the best and most efficacious outward remedies in all-Physick, provided it be made use of, when 'tis yet indued with its Volatil Salt: For it opens, attenuates, resolves, is abstersive, and admirably cleansing; and we know, who have experimented it, that the continued anointing with it, accompanied with the internal use of the Volatil Salt, produceth admirable effects in the parts labouring under the Palsey, and deprived of motion, and even in those, that are dryed for want of the communication of Spirits and nourishment. A little Spunge imbibed with this Oyl, carried in a little box pierced, and often smelled to, is very good in the time of the Plague, to keep off the ill Air, and to fortify the Brain, and the noble parts. It is also good to make it to be smelled, to put of it in the nostrils, and to annoint the Temples with it, in Epileptical Symptoms, and for those, that are troubled with giddiness, and have their Brain charged with vapors or flegme; for it gives them vent, and dispels them powerfully. It hath also a considerable effect against the suffocations of the Matrix,

trix, and against all sorts of worms; in which case, some drops of it may even be given at the mouth, in wine, or broth; and the hollow of the stomach anointed therewith. It visibly dissipateth all outward contusions, and serveth much for inward ones, and especially for those of the Head. It resolves tumours and hardnesses, giving issue by the pores to such matter, as can transpire, digesting the grosser, and bringing them to a laudable suppuration. It is also abstersive and cleanseth all sorts of Ulcers, and healeth all the distempers of the skin, even the most stubborn, provided the internal cause thereof be removed. In all which evils its effects are yet more quick and powerful, if it be enforced by the internal use of the Volatil Salt, which, in a word, is that, which gives it its main vertue.

We shall add, on this occasion, that the Ancients valued very much their Oyl of Vipers, which they prepared several ways, some by infusion, some by the decoction of Vipers in Oyl of Oliues. If they had rightly proportioned the quantity of Vipers with that of the Oyl; if they had added thereto what moisture was necessary; and if

if in this they had employed some good method, this Oyl might produce good effects, and we should approve of it, and refer our Readers to it. But finding nothing regular in all the Preparations, by them described, we thought good here to set down one, according to all the rules of Art.

Take about the end of *May*, or the beginning of *June*, a dozen great Vipers newly taken, cut each of them into seven or eight pieces, and put them into a well glazed and strong Earthen pot: powr upon them three pounds of Oyl of Olives, and one pint of white wine; cover the pot well, and make it boyl over a gentle fire to the consumption of the moisture. Then strain all, squeeze out the Vipers well, and keep the Oyle for use. In the mean time, fear not (as the Antients did) the Vapors, that may issue out of the pot during the decoction; for the Vipers, as we have said, have no poysone in all their body. This Oyle, thus prepared, hath not, 'tis true, all the strength and vertues of the distilled Oyle, of which we were speaking a little before; but it may very well serve for an oynment in all the distempers

Stempers of the skin, in contractions of nerves, in rheumatismes, & in many other evils.

CHAP. IX.

Of the Manner of using the Volatil Salt.

Although it be impossible to specify in particular all the wayes of Using the Volatil Salt of Vipers, no more than one can well enumerate the sicknesses, that may have need of it; Yet, in some degree to satisfy those that may desire it we shall make here an Abridgment of a good part of what we have seen practis'd by Pyhsitians, that perfectly know the qualities and proprieties of this Salt, and use it daily to the great benefit of their Patients.

You must *first* know, that its piercing Taste hinders it from being given alone, and that it must be mix't, *now* with some

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Aliment, as in broth, the yolk of an egg, a rosted apple, a little jolley, &c. *sometimes* with Medicines, and that innumerable wayes, which partly depend from the humour and disposition of the Patient, but chiefly from the wit, knowledge, and discretion of the Physician. For this Salt call's for a Physician, that hath sufficient ability to know and measure its force and activity; that is intelligent and versed in all Maladies, to be able beneficially to employ it in those that require it, that knows to chuse a favorable time and occasion; and to mix it pertinently and to good purpose with such things, as may not change its nature nor divert its operation, nor subvert the indication, he shall have taken. So that 'tis necessary, to be equally assur'd of the genuine and methodical preparation of the Salt; of the knowledge of its qualities and vertues; of the nature of the distemper, of the condition, temper, and strength of the Patient; of the fitness of its exhibition among aliments or appropriated medicaments, and of the occasions and the time, in which it may be usefully employed. And when a due regard hath been had to all these circumstances, men will

will not fail to finde very good effects of it. But that those, who are not accustom'd to make use of it, may not unawares finde in it effects contrary to the nature of this Salt, we have thought ourselves obliged to advertise them, that they must above all things avoid mixing them among *Acids*, and especially among Spirit of Salt, Vitriol, Brimstone, and the like, which would fix it and destroy its operation. To find therefore facility in its exhibition, it may be taken in distilled waters, or ptisane, or such decoctions as are appropriated to the disease; as also in Juleps, Emulsions, or Potions diversly composed. It may also be mix't in Conserves, Extracts, Confeti-
ons, and the like; as also in Lozenges and Opiats, diversly made according to the nature of the distemper, and the intention of the Physician; It is also mingled with Purgatives, Sudorifiques, Aperitives and Diuretiques; and no less, with its own fix't Salt, and such other Salts, as are not contrary to it. It is also given in Wine, and among certain Mineral waters. It may be administered to both sexes, and to all ages, at all times and hours, between meals according to the nature of

the disease, and the intention of the Doctor. It may be taken, if one will, several times in a day, and even at night; and the use of it may be continued for a good while.

As to its dose, that is different, according to the occasion, age, temper and humour of the Patient, and the nature of the distemper, and the reiteration made of it: For, the dose is to be much less for those, who take it often in one day, and continue the use of it, than for those, that take it but once in a case of need. Sometimes 'tis esteemed sufficient to give 6. 8. 10. or 12. grains of it; but on certain occasions we may give 20. or 25. grains, and some-times, half a drachme, and even a whole drachme. But discretion and skill is to be used; without which, this Salt, as excellent as 'tis, may produce effects quite contrary to what the Physitian and the Patient might expect from it.

CHAPT. X.

Divers Remedies or Compositions, of which the Volatil Salt of Vipers is the Base or Ground.

WE had not undertaken to describe the vertues, nor the Uses of the Volatil Salt of Vipers, no more than of the Fix't Salt, and of the Oyle that riseth by Distillation, if this our Book were only written for the skilful Physician, who perfectly knows all, and especially the parts that may be drawn from the Viper. But being desirous to do a good office to such persons, as have no knowledg thereof, or that knowing it in part, have need to be directed, especially in the exhibition of this Volatil Salt; we thought good to conclude this Book with the *Receipts* of

the chief Compositions of which this Volatil Salt may be the Ground, which are not found in Books, and may produce Effects worthy of this Salt.

And knowing, that there are many curious persons, who having a great esteem for the Viper and its uses, make preparations thereof in private, following the Receipts they find in Books, which sometimes are well, sometimes ill prescribed, or ill executed; We shall impart to them an *Elixir of Vipers*, that shall be of great vertue, pleasant to the taste, of easy preparation, and of long duration.

Take four douzen of Hearts and as many Livers of Vipers, dry'd in the shade, and reduced to powder; two drachmes of good Cinnamon, half a drachme of Cloves, grossly beaten: put them into a strong glass-bottle, holding about two pints. Powr on it a pound of the *Queen of Hungary's Water*, a pound of Melisse-water, half a pound of Orange-flower-water, and half a pound of Rose-water. Close the bottle exactly, and expose it to the Sun for fourty dayes; after which dissolve in the liquor a pound of fine Sugar; and pass all through a clean bagg. Put up this

this Elixir in a Bottle, and add to it half an ounce of the Volatil Salt of Vipers, well rectified, twelve grains of Levant-Musk, and as much of Amber-gris. Close the bottle exactly, and you may keep this *Elixir*, to use it in time of need, from half a spoonfull to a whole. You may take of it in the morning upon an empty Stomack, and at all hours, according as necessity shall require. This medicin is very good and very convenient: It is not onely proper against all Poysons, against the Plague, and all Contagious and Epidemi-
cal diseases, but it also fortifieth all the noble parts, preserves the Natural heat in good condition, and by this means the use of it conduces much to preserve Health, and to prolong Life.

The *Elixir* following deserveth also to be communicated to the Public, as a medicine that is not common, and is very available, not onely for the Sicknesses of men, as well in the Brain, as the Stomack, and all the noble parts; but also very particularly, for most of the diseases of Women. I shall give you here the Description of it. Take an ounce of good Saffron, as much of fair Myrrhe, as much of *A-*

loes Socotrina, and the same quantity of White Amber; a drachm of the Extract of *Opium*, and as much of the Extract of *Castor*. Mingle your Extracts in a little Spirit of Wine; pulverize all the rest; and put altogether in a Glass-Body: powr upon it three pounds of Spirit of wine tar-tarized, place the Body in a Bath of Ashes; fit an Head to it, with its Recipient, well luted together: Give it a moderate fire, and draw from it about the moiety of the Spirit of Wine; then unlute your vessels, decant the tincture, that will swim above your powders, which will be found very much imbued with all their qualities; and keep it by itself in a bottle well-closed. Powre the spirit of Wine, which you have drawn off, upon the remainder in the Body; Fit again to it the Head and the Recipient, and draw again from it the half of the Spirit of Wine. Decant again the tincture swimming a top, mingle it with the first, and keep it likewise. Cobohate for the third time the Spirit of wine, drawn off, upon the remainder in the Body; proceed as before, and powre off the tincture swimming a top, and mingle it with the former: then filter all three toge-

together, and powre all into a strong Viall, adding to the whole an ounce of the Volatil Salt of Vipers, which will easily dissolve in it; keep the whole thus mix't and well closed. The dose may be from ten to sixteen drops.

We shall yet adde to this an *opiate* of great efficacy for most distempers of the Brain; and tis this. Take half an ounce of the Extract of the root and seed of the male-Pæony; and of the true Mistletoe of the Oak, and of that of Betony-flowers, and of that of Clove-gilly-flowers, the same quantity of each of them; three drachms of the Confection of *Alkermes* of *Mesue*, three drachms of the Volatil Salt of Vipers, one drachme of the Volatil Salt of *Succinum*, two drachms and an half of prepared Pearl, and as much of Crabs-eyes prepar'd; three drops of Cinnamon-oyle, and as much of the oyle of Mace: Mingle all according to Art, and make an Opiate of it, and keep it in a pot of Fayence (a sort of fine white Earthen pots) well closed. The dose of it may be from a scruple to a drachme.

You may also make, in the following manner, an opening and laxative Opiate,

that

that shall conduce to the cure of sundry long and stubborn diseases, especially of those that are caused by several obstructions of the parts. Take of the Conserve of Tamarisk-flowers, of the Conserve of the Flowers of *Genista* or Spanish-Broom, of that of Mary-gold, and of that of the Male-peach flowers, of each six drachms; half an ounce of the Volatil Salt of Vipers, as much of the Extract of the ordinary *Iris* root, and as much of the Extract of Rubarb; two drachms of the fixt Salt of Vipers, as much of the Mineral Bezoar, and as much of the Salt of Worm-wood; a drachme and an half of Rosin of Scammony, and as much of the Extract of Coloquintida; and a drachme of the powder of Cinnamon. Mix all these things together, and adding to it, as much as needs, of the Syrup of Succory, compounded with Rubarb, you shall make an Opiate of it, the Dose of which may be from one drachme to two, and even to three for stronger Bodies.

There may also be made Pills, that shall have a vertue near the former in efficacy, to be taken in a less quantity. Take of the Extract of Aloes, made with the juyce of

of the cleansed flowers of Violets, of the Extract of Rubarb, and of that of the Levant-Sena, of each two drachms; as much of the Volatil Salt of Vipers, as much of the Rosin of Scammony, and as much of the Gumm Ammoniac in drops; one drachme of Mineral Bezoar, and the like quantity of the Fixt Salt of Vipers. Reduce all into a mass of Pills, of which the dose shall be from half a scruple to two scruples.

Those, whose stomach shall be troubled with tenacious humors, such as could not be carryed away by Purges, or other remedies; those, that have a nauseousness, and are subject to troublesome resentments from the Stomach, may to good purpose use the following powder.

Take of Coriander-seed (that is not prepared with Vinegar, according to the ill way of the Antients, but such as is sold in good shops,) of Anis-seed, of sweet Fennel-seed, of the root of Lickorish well scraped and dryed, of each half an ounce; three drachms of the Volatil Salt of Vipers, and as much of Crabs-eyes prepared; two drachms of the Fixt Salt of Vipers, and as much of well-chosen Cinamon. Bring all to

to a fine powder, and adde to it its weight, or if you will, double its weight of fine powder'd sugar. Close this mixture in a Glass-vessel, or in one of the fine white Earthen pots, and close it carefully. You may take of it, at a time, from half a spoonfull to a whole, according as you have put more or less Sugar to it. You may also adde to the powder some drops of the Oyl of Anis, and of the Oyl of Cinnamon, and even of Musk and Ambre-gris.

This Volatil Salt is to very good purpose mix't among the Sneezing powders; for besides that it penetrates exceedingly by its activeness, it also discharges the Brain powerfully, and withall fortifieth it. It may be mixed with the powders of Beto-ny, Marjoram, Rosemary, Arabic, Stæ-chas, Sage, and the like, not putting but a sixth part of our Volatil Salt among these powders.

Those that would have an Opiate, proper not onely to fortify the Heart, the Stomach, and all the noble parts, but also to expell all kind of Venom, and all the impurities of the mass of Bloud, and of the solid parts, and to make them issue out at the pores of the skin, or at the other emun-ctories,

Stories, may prepare very beneficially the following Opiate.

Take two ounces of the Conserve of Gilly-flowers, one ounce of the Confection of Alkermes, ambred and musked, six drachms of the Volatile Salt of Vipers well rectified, half an ounce of the Confection of Hyacinth, as much of the Electuary of *Diascordium*, three drachmes of the Mineral Bezoar; and of Pearl prepar'd, of Crabs-eyes prepared, of the Extract of Angelica, and of that of Carlina, of each of these the same quantity; two drachms of the Salt of *Carduus Benedictus*. Mix all together, and reduce it to an Opiate, by adding to it some Syrup of kermes, or the Clove-Gilly-flowers, as much as needs to give a good consistence to the Composition: Which you are to keep close for your occasions. You may take of it, for a preservative, half a drachm; at a time, in Wine, or broth; but in urging sicknesses, you may take of it a whole drachme, and even two drachms.

Those that will use the Oyl which hath been drawn by Distillation, may either employ it all alone, or mingle it with an equal quantity of *Unguentum Martiatum*, and even

even adde to it Oyles distilled of Rosemary, Sage, Lavender and the like.

Those, that shall well consider these Receipts, will finde therein not onely a fit proportion in the dose of all the particulars, but also great cautiousness in mixing nothing with them, that may destroy or change the nature of our Volatil Salt; which is the thing, most to be avoided in the exhibition.

We might here adde many other Compositions, of which the Volatil Salt of Vipers may be the Ground; but we have contented ourselves to deliver these for examples, knowing, that there may be found divers others, good enough, in Books, and esteeming, that 'tis better to prepare them upon occasion according to exigency, and following the Receipts, which able Physitians may prescribe thereof.

We have also explain'd ourselves suffici-ently in all particulars. We would have been more large, if we had not apprehend-ed we might exceed our bounds, and under-take things, which might be thought to be beyond our reach, and to belong onely to knowing Physitians.

Those that know well to prepare this

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Volatile Salt of Vipers, and to unite it well with the Volatile parts of Plants, and with the Sulphureous parts of certain Minerals, that are friendly to our nature, may say, that they have made some progress in their Profession. We labour daily, and wish ourselves able in time to impart something to the publick, that may be more accomplisht:

F I N I S.

